

GENERAL LIBRARY

JUN 7 1920

UNIV. OF MICH.

WILLSON  
LIBRARY

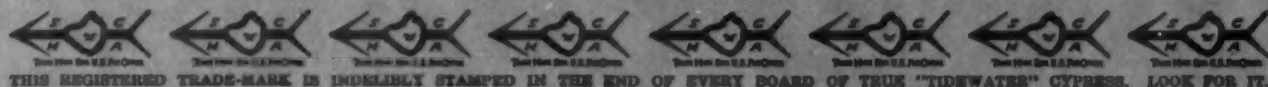
# THE ARCHITECTURAL FORUM



MAY  
1920

---

Single Copy Sixty Cents   ROGERS AND MANSON CO., PUBLISHERS   Six Dollars the Year



THIS REGISTERED TRADE-MARK IS INDELIBLY STAMPED IN THE END OF EVERY BOARD OF TRUE "TIDEWATER" CYPRESS. LOOK FOR IT.

# CYPRESS "The Wood Eternal"

is accounted conspicuously fine for the inside trim of the house, especially for the kitchen. It is not "put on the warp" by steam and other forms of moisture, such as too often infest the kitchen. Then the grain is handsome and it takes a most beautiful finish. Why should not kitchens be attractive? Would it not help solve the servant problem? Cypress lasts and lasts and lasts and lasts—and always "behaves."

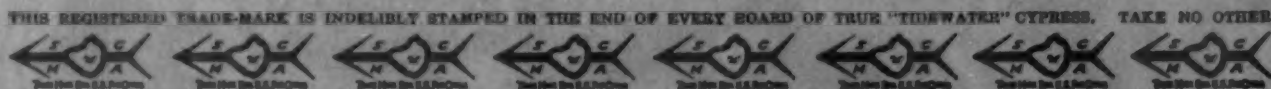
Let our "ARCHITECTS' DEPARTMENT" help YOU. Our entire resources are at your service with reliable counsel.

*We invite correspondence  
with a serious purpose in it*

## Southern Cypress Manufacturers' Association

1234 Hibernia Bank Bldg., New Orleans, La., or 1234 Heard National Bank Bldg., Jacksonville, Fla.

**SPECIFY AND INSIST ON "TIDEWATER" CYPRESS.  
IDENTIFIED BY THE CYPRESS ASSN.'S REGISTERED TRADE-MARK.  
IF IN ANY DOUBT, PLEASE WRITE US IMMEDIATELY.**



THIS REGISTERED TRADE-MARK IS INDELIBLY STAMPED IN THE END OF EVERY BOARD OF TRUE "TIDEWATER" CYPRESS. TAKE NO OTHER







COURTESY OF POSTER BROS., BOSTON

OLD CAMBRIDGE STREET CHURCH  
NOW BRANCH LIBRARY, BOSTON, MASS.  
From the lithograph by A. H. Hepburn



# The ARCHITECTURAL FORUM

VOLUME XXXII

MAY 1920

NUMBER 5

## The American Institute of Architects' Convention

WASHINGTON, D. C., MAY 5, 6 AND 7

THE annual conventions of the American Institute of Architects are always of interest in that they provide an index of the conditions affecting architecture and its practice in the various parts of the country, through the exchange of experiences enjoyed by the delegates. The influence and importance of the recurring meetings may be attributable more perhaps to the opportunity they present, in the brief respite from the details of practice, for informal appraisals of effort and for the pleasant acquaintances that are renewed, rather than to any weighty matters that are discussed or settled. The recent convention proved no exception to established custom, and after recalling the work of the three days' meetings, it is difficult to record the net accomplishment as being any great addition to our fund of architectural knowledge, or contributing any clear guide in pursuing the difficult path of practice, or providing a stimulus for a wider extension of architectural activities.

It is the more remarkable, too, that so little enthusiasm was shown for the larger opportunities the future holds for architecture through concerted effort of the profession, for there was perhaps never a period in the world's history in which the value of organized effort was so generally recognized as it is to-day. This convention did differ from previous ones in that the dominant spirit of the day was noticeably absent. One needs only to recall the convention at Philadelphia in 1918 and the convention at Nashville last year to know that national economic and political conditions can affect an Institute convention. Those were years of doubt and uncertainty, and perhaps, as one delegate expressed it, it is true of architects that they are active in their associated welfare only in times of depression. There was no ringing call to bring architecture to the forefront of the great social and economic development this country is about to enter. There were many references to service, but they lacked the power and confidence that should accompany a statement of purpose of the architectural profession to-day. It might be

assumed that intimate contact with the capital city, which is favored with so many worthy architectural monuments, would prove effective in creating inspiration to strive for a larger place in to-day's life, but it was rather the deadening effect of official Washington and the uninspiring rôle of super-conservatism that was successful in imparting color to the convention.

The foregoing may indicate that no progress in the development of architecture and its practice was evident, and if it should, that would be creating an impression wholly untrue. There was evidence of progress, but it cannot claim any great mark of recognition, when it is compared, as it is most natural to do, with the results that should have marked a national convention at so important a period in the modern development of the profession. There was at various times promise of discussion that would lead to a larger viewpoint; there was general approval of references to the larger work of the Institute, but they died away without tempting the delegates to visualize the opportunities that lie ahead.

The chief interest for most of the delegates centered on the report of the Post-War Committee. The work of this committee has been productive of much concentrated thought, and it has brought the Institute in closer touch with architects not members of the Institute, and with the representative bodies of other professions in a way no former effort ever achieved. The moving spirit behind the Post-War Committee movement has been President Kimball, and in his opening address to the convention, his satisfaction with the work accomplished and his confidence in the results yet to be produced were warmly expressed.

The first session on Wednesday, May 5, was largely taken up by the treasurer's and board of directors' reports, following which was presented the report of the Post-War Committee, of which N. Max Dunning of Chicago was chairman. The general accomplishment of this committee has been the careful compilation of opinions emanat-

ing from architects in various phases of practice with reference to relations as they exist and as they should exist between other architects, engineers, contractors, clients and society in general. It has been instrumental in calling forth a great deal of discussion of important questions with reference to architectural service that has been productive in aiding the profession to re-establish itself following the war, and to meet new conditions in practice that have been particularly evident since the general resumption of business.

Some of the detailed results of the committee's work cover the following fields: registration laws, state architectural societies, co-operation with related interests, improvement of service, professions and education. Summarizing the work briefly, the committee has secured practical data on registration laws which it has placed, with suggestions for procedure to secure such laws, in the hands of individuals and organizations in practically every state. It has prepared a bulletin setting forth the desirability of organizing state societies of architects and has formulated a tentative model constitution and by-laws that could be placed at the disposal of groups of architects interested in forming such societies. The work along co-operation with related interests, covered meetings with contractors' organizations and the Engineering Council, which hold promise of greater coördination of architects and these other important factors of the building industry.

The most outstanding work of this character is the National Board of Jurisdictional Awards, which is now favorably known to the profession and the building industry. It is gratifying that this important work in the abolition of strikes in the building trades should be inaugurated by architects. The work has been most ably carried out by the Institute's committee chairman, E. J. Russell of St. Louis, and the general approval of his work is attested by the fact that he has been made permanent chairman of the national board.

Under the topic, "Professions," the most important object attained was the organization of the Inter-Professional Conference held at Detroit, November 28 and 29, 1919, at which the representatives of fourteen professions formed a national organization which promises to develop means whereby the service of each profession may be improved and their combined efforts exert a more beneficial influence on public affairs.

The great amount of tabulated data and the conclusions of the committee have been turned over to the Institute, and the committee disbanded, although the results of its work are so arranged that they can be followed to definite conclusions by a regularly constituted Institute committee.

It must be noted in passing that many of the problems which it was generally thought the committee would discuss to a conclusion and tender definite proposals, either confirming the wisdom of present practice or suggesting alternative methods, are still left in an undecided stage and covered only by a statement from the committee that further study of them is suggested. Possibly the details of architectural practice, relation of architects to society, the function of the Institute and other similar questions are too complex to enable any group of men to arrive at a tentative answer to them, but some definite suggestion pointing to a solution does seem to an observer possible of attainment.

There was no particular subject that stood out as the leading topic of the convention, the questions discussed covered the whole range of Institute activities from details of official procedure to plans for public service of the profession. The committee work and related matters that were referred by the board of directors to the convention for action included education, the Institute Press, structural service, state societies and regional representation on the board of directors. The last is a suggested arrangement whereby the United States would be divided into nine sections, each of which would be represented on the board by a director chosen by the respective districts, three to be elected annually as now.

The work of publishing the Institute *Journal* will now be carried on by the newly incorporated American Institute of Architects' Press, managed by a board of five directors elected by the Institute board. The Press is well financed and the *Journal* should enjoy as a result a wider opportunity for service.

The evening of the first day was given over to the first National Architectural Exhibition, held under the direction of the Institute at the Corcoran Art Gallery. This will be a regular accompaniment of future conventions. The exhibit was representative of the whole country, interesting architecture being shown from such widely separated states as Washington, Louisiana and Massachusetts. The buildings were largely those executed before the war and consequently well known to the profession through publication. This was only natural in view of the absence of new work till recently, and in late months there have been neither time nor draftsmen to make exhibition drawings. Future exhibitions will undoubtedly have more the character of an important national affair; the idea of inaugurating them was a happy one and they should become an event of importance in the architectural world.

The morning of the second day was devoted to



regular organization matters and the nomination of officers and the report of the Committee on Small Houses. At the last convention great interest was expressed in perfecting some method whereby the services of architects might be made available to large numbers of people who build small houses, but are unable to secure in them much character or architectural fitness because of their inability to employ an architect. A committee was appointed with Edwin H. Brown, Minneapolis, chairman, to study the subject, and this committee has arrived at a definite means of carrying out a proposal that met with the satisfaction of the convention. Briefly, the plan contemplates state organizations of architects who will subscribe to a limited amount of stock in a limited dividend paying corporation, the member architects of which agree to prepare standard small house plans and specifications that can be sold to the public at moderate cost. Any profits resulting from the enterprise will be utilized in reducing the cost of the service to the home-builder. The first state organization is already under way, sponsored by the Minnesota chapter, and the Nebraska chapter has recorded its interest in an organization. The Minnesota organization has begun the publication of a magazine to bring its service to the attention of the public in keeping with a plan to carry out the idea along modern business lines. The eventual scheme which the convention approved is a parent organization under the control of the Institute that can render a national service; the work of publicity then will become a part of the activities of the Institute *Journal*.

A question that seems vital to the future position of the Institute is its relation to independent state societies of architects. This claimed the greater part of Thursday afternoon. The 1919 convention voted in favor of encouraging the organization of state societies and the Post-War Committee likewise recommended a similar policy, but following last year's convention such a policy has appeared to some members not compatible with the best interests of the profession or the Institute. In accordance with the instructions of the 1919 convention, delegates of the various existing state societies were invited to attend the Washington convention and there were fourteen such organizations represented. This is the first time delegates of any unaffiliated society participated in an Institute convention, and it has established a precedent that has undoubted merit.

The resolution of the convention which called for the entire matter to be reconsidered by a special committee was eminently sound, for if unification of the profession is desired, it would seem logical

to weld existing organizations together, rather than encourage the establishment of new ones, irrespective of vague ideas that these newly created societies which have a tendency to thrive would eventually provide members for the Institute.

An opportunity at the end of the day to visit the Lincoln Memorial, designed by Henry Bacon and now nearly completed, injected a note of inspiration that was appreciated by the delegates after participating in lengthy discussions which seemed to emphasize for the most part the shortcomings of the profession. The wonderful scale and simple dignity of the memorial command at once the attention of the visitor. Daniel French's statue of Lincoln is yet to be unveiled and the long lagoon marking the approach to the memorial is only indicated by the steadily working steam shovels, but withal the simple magnificence of the scheme was evident to all.

The evening of Thursday covered the most fully developed result of the Post-War Committee's work—the Inter-Professional Conference—at which Robert D. Kohn presided. A vision of the work the Conference through association of the various professions can do in service to mankind was given in the remarks by Samuel T. Ansell, former acting judge advocate general of the Army, representing the law, and Dr. William G. Ebersole of Cleveland. Dr. Ebersole incidentally presented convincing illustrations that the architectural profession undervalued its services and pointed to the need of adequate remuneration for the highly skilled and competent service that the public expects to-day of professional men. It was interesting to learn that the organization of local inter-professional bodies is taking form following the recent beginning of the movement, an especially active association having been formed in Cleveland and another in process of development in New York. The formation and guidance of the movement it is pleasing to record is the work of a group of architects.

The closing day witnessed an animated discussion of a question occupying the attention of architects in the larger cities; namely, the relation of the architect to draftsmen. The discussion, which was widely participated in, was characterized chiefly by a confession on the part of the architect that he had not fully sensed the duty he owed the men working as assistants in his office. It is typical of the times that the question should arise, and it will prove of ultimate benefit to the profession that it has, because the great reservoir of future architects is the large group of draftsmen, and their usefulness to society and their representation of the profession will depend largely upon the type of training and the viewpoint of prac-



tice obtained from their contact with offices.

There are two evidences of the movement among draftsmen for a different status; they both partake of organized effort, but of widely different character. One is best described as the trade union and is supported principally by men who have no interest in becoming architects and are employed in municipal, governmental, and large engineering and architectural corporations. The other is a mutually helpful association of men interested in the advancement of the profession and themselves as individuals, who feel that through organization they can obtain better opportunities, but who appreciate the professional character of their work and have no wish to debase it. The latter type of organization is represented in New York City, and there have been a number of meetings between its representatives and a committee composed of members of the New York and Brooklyn chapters of the Institute, and architects who participated in them stated that they were helpful in bringing about a clearer understanding of the problems involved in the present management of architectural offices. Suggestions were made that some special class membership in the Institute might be created that would offer draftsmen the opportunity for association they want, but this seems impracticable for definite reasons. The interests of architects and draftsmen are not identical, and wholly frank and complete discussions of their respective problems could not always effectively be had by joint action. The result of a lengthy consideration of the problem was the recommendation of the convention that architects encourage the formation of such organizations of draftsmen that look upon their calling as a profession and not a trade, and extend to such associations their active help in providing opportunity for education in professional matters that will aid their members to acquire the necessary qualifications for satisfactory independent practice.

The architect's obligation to his draftsmen was also linked up with the discussion of architectural education, which appears with regularity on each convention program, but nevertheless remains one of the questions that seem unanswerable. A resolution was passed favoring an extension of the usual architectural school course to five years, in order to permit more time for the study of construction and office practice, which are to-day in most courses seriously curtailed. It devolves more or less to a question of the actual function of an architectural school; some would have the schools graduate highly developed draftsmen, but the more constructive and broader thinking man recognizes that the school must lay the foundation of theory in design and construction that will serve

as the substantial background with which will readily combine the practical knowledge acquired in office detail. It is, therefore, incumbent on the office to recognize its obligation to the beginner; he should be given an opportunity of coming in active contact with different phases of practice as he acquires proficiency, and, in doing this, men of broader attainments will be developed and there will be less feeling on the part of draftsmen for the need of organizations to improve their conditions of employment.

The matter of competitions was not neglected; there was developed as a result of a resolution presented by the Boston chapter one of the most lively and general discussions of the three days. The Boston delegates suggested the recognition of an informal competition for smaller work in which an owner is desirous of obtaining ideas from more than one architect and is willing to pay each employed a fee, but does not want to make use of the usual competition and jury, considering that he is fitted to make his own selection of the design. The Boston plan provided that such an arrangement could be carried out with a professional adviser who would place identical information regarding the client's needs with every competing architect. The plan did not receive the necessary support, however, to be approved.

The difficulty of meeting varying local conditions by the policy of a national organization is illustrated by this example. It is generally recognized that practice varies greatly in different parts of the country, and that it is obviously impossible to apply the same principles to all and secure general satisfaction. It may not be many years before this is recognized by the Institute and the chapters given larger discretionary power in formulating principles to accord with local conditions.

The year's craftsmanship medal was presented to Samuel E. Yellin of Philadelphia for achievement in wrought iron craft.

A sequel to the recent meeting of Philadelphia architects and the local Bricklayers' Union was the presence at the convention of William J. Haggerty, member of the Union's Committee on Education, as the guest of D. Knickerbacker Boyd.

The election of officers for the year was as follows: President, Henry H. Kendall, Boston; first vice-president, Charles A. Favrot, New Orleans; second vice-president, William B. Faville, San Francisco; secretary, William Stanley Parker, Boston; treasurer, D. Everett Waid, New York. The following directors were chosen to serve three years: Charles H. Alden, Seattle; N. Max Dunning, Chicago; Abram Garfield, Cleveland; E. J. Russell, St. Louis.



## Buckman Village

U. S. SHIPPING BOARD HOUSING DEVELOPMENT AT CHESTER, PA.

G. EDWIN BRUMBAUGH AND SIMON & BASSETT, ARCHITECTS

**B**UCKMAN VILLAGE is one of the housing projects of the United States Shipping Board Emergency Fleet Corporation which was substantially completed before the armistice was signed. In fact, the first prospective tenants were inspecting the village the day of the famous peace "hoax."

Because the area was limited, and the accommo-

dations required were heavy, the plan is, of necessity, intensive. To utilize the space to the full, minimum street widths and lot divisions and group houses were adopted.

The entire village comprises a trifle over 38 acres. There are 278 houses in groups of two to eight, 106 apartments, 4 stores, Buckman Inn, accommodating 150 men in single rooms, with



Plot Plan of Buckman Village



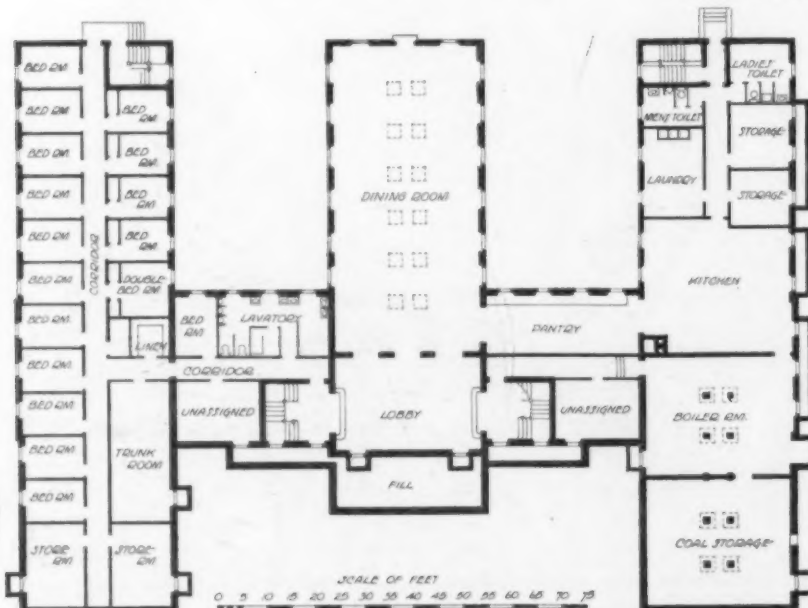
View on Thirteenth Street Showing Groups of Four and Six Houses

dining and recreation rooms, a community building (the old Buckman residence, embellished with a new shingle roof) and two parks.

Certain principles were established at the outset to govern the design. It was decided that the architecture should be uniform throughout, the scale intimate, and picturesqueness rather than formality should be the keynote. A study of the then existing housing developments in America forced the conclusion that community consciousness is but faintly developed, and uniform community care is almost unknown. As nothing is more pitiful than shabby formality or symmetry struggling to express



Second Floor Plan of Boarding House



First Floor Plan of Boarding House

itself against the terrible odds of varicolored window shades, conflicting tints in painted woodwork and individual ideas about landscape architecture, everything approaching formal treatment was carefully avoided.

The delightful old farm and village groups which have survived from the days of the colonies in every eastern community furnished the style. Rambling, picturesque, and of necessity, simple in detail, they have withstood neglect and changing "styles," and alone, of all our architecture, are beautiful in their decay.

The plan of the village is very simple, and was dictated largely





Houses at the Corner of Maple Lane and Eleventh Street Containing Four Flats Each

by the topography. Keystone road, the "main street," runs along the natural crest of a broad plateau, from which the ground slopes rapidly to the bed of a small stream. Meadow lane parallels Keystone road at the lower level, and the other streets are all arranged to provide natural circulation, economical blocks and connection to existing Chester streets. Keystone road, when extended a short distance beyond the village, will join the end of a township road of the same name. Two splendid groves of trees at opposite ends of the village were carefully preserved as parks, and a small open square or "commons" was established at an intersection of streets near the trolley station. Fronting on this commons is the group containing the village stores.

In the design of the houses a unit system was evolved, in which two houses were considered as an "end unit," and by effecting various combinations of comparatively few units, variety was easily obtained. Unsymmetrical groups were designed and scattered along all the streets, in an effort to simulate a more slowly developed community. The houses were not lined up, but were placed at varying distances from the front property line, so that everywhere the prospect is varied. All materials consistent with the underlying Colonial style were used. There are brick houses, stucco houses, brick and clapboard, and stucco and clapboard, and it is surprising how totally different the same group looks in a different combination of materials. The uniform use of



View Down Eleventh Street Showing Boarding House at Extreme Right

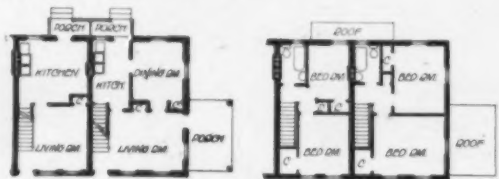


First and Second Floor Plans of Typical Four-Flat Houses

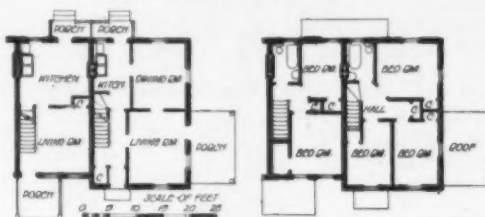
black Pennsylvania slate (the Government would not allow green Vermont slate because of the shortage of freight cars) did not prove to be the calamity anticipated, and really provides a rather pleasing architectural "tie" throughout the village.

A serious effort was made to avoid the alleys which group houses seem to demand. The attempt was finally abandoned, because none of the solutions devised could be reconciled with the typically American desire to live "on a front street." Attention was then directed toward making the alleys as inoffensive as possible. The chimneys, enlarged by the addition of ventilating flues, help to make the rear elevations interesting.

The apartments were planned in groups of four,



First and Second Floor Plans



First and Second Floor Plans

Typical Terminal Units of Two Single Houses

that small two-story houses need not be monotonous or ugly because they are in rows.

It may not be too much to hope that it will influence the eventual abandonment of the row house altogether in favor of the group house of many units as its logical successor.

to give maximum light and air, and because apartment dwellers are apt to be convenience seekers, the apartments were all grouped about the entrance to the village, near the stores and trolley line.

Buckman Inn was placed on Meadow lane so the Inn "boarders" will use a different trolley stop from the rest of the villagers.

Many things were learned which it is not the province of a short description to dwell upon; but perhaps most important of all the lessons was the vindication of the age-old principle that simple materials structurally used are better than fine materials falsely used.

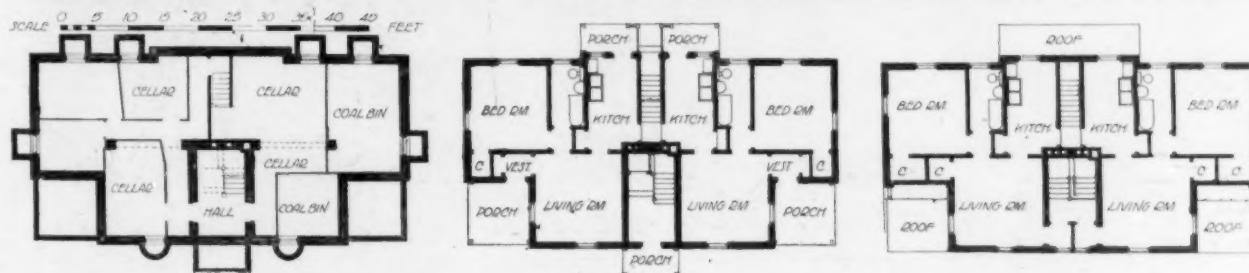
It is to be hoped that Buckman Village may add to the steadily accumulating proof



Two-Family House at the Corner of Meadow Lane and Eleventh Street



STORES AND APARTMENTS AT THE JUNCTION OF KEYSTONE ROAD AND MAPLE LANE



BASEMENT, FIRST AND SECOND FLOOR PLANS AND VIEW OF FOUR-FAMILY HOUSE OF ONE TYPE  
HOUSING DEVELOPMENT, BUCKMAN VILLAGE, CHESTER, PA.





VIEW ON KEYSTONE ROAD TOWARD TWELFTH STREET



SINGLE FAMILY GROUP HOUSES ON MEADOW LANE



VIEW IN THE DIRECTION OF ELEVENTH STREET FROM THE OLD BUCKMAN HOUSE

HOUSING DEVELOPMENT, BUCKMAN VILLAGE, CHESTER, PA.

G. EDWIN BRUMBAUGH AND SIMMON &amp; BASSETT, ARCHITECTS

## Interior Decoration

SOME DOMESTIC INTERIORS FROM THE WORK OF HOWARD MAJOR

By HELEN CHURCHILL CANDEE

ONE dominant, actuating thought runsthrough each work of Howard Major's, and thus he arrives at fitness and consistency, which are the foundation stones of beauty. The situation of the house determines what manner of house it shall be, into which general class it shall fall—country house, urban or suburban. Beginning thus, the utmost consistency is maintained in the structure, in the interior finishing, and finally in the decoration and furniture.

The public is well educated to the belief that only an architect can design a house with an exterior which is pleasing and distinguished, but it is taking far longer to impress the idea that a tyro makes only utter failure in assembling the arts that make up the perfect interior. It is but natural. The household gods have tendrils that clasp the human heart as the ivy vine clasps stone walls. "*Je meure où je m'attache*," says the ivy, and so says many a set of furniture, of curtains, of mantel ornaments that the home maker is firm about retaining. And thus comes a terrible hodge-podge of things loved for association's sake. Of all do-

mestic mistakes never was a greater than this, to continue to live amongst things of bad taste because once one knew no better.

There is, however, an even more subtle preventive to tasteful interiors on the part of the public. It is the belief, latent in most women, that they have a gift for decoration. This one fallacy does more to retard taste in the home than any other, for it leads clients to stop professional work at the newly finished front door.

It is true that many a woman has a knack of assembling and contrasting colors, of catching or forecasting a clever though ephemeral mode, and of creating an effect that abounds with femininity and fashion. But the effect has so little lasting value that in a year or two, when it has lost its youth, it seems not what it was. The mellowing of time is but the withering of the rose on work such as this.

There is a subtle matter called good taste which is partly a natural gift, but which depends mainly on knowledge accumulated slowly and with an enthusiasm that never flags. Every architect is



Dining Room in the House of W. J. Grant, Esq., Pelham, N. Y.

not thus fitted for interior work, but to this art Mr. Major has given happy attention. He has a feeling for interiors that amounts to an instinct. He makes them correspond to the exterior, a necessity which many disregard. It is with somewhat of a shock that one meets anachronisms in houses, as in one example where a wild-wood, one of America's enchanting tangles, leads to a fifteenth century Italian convent in stucco, with arched pergola and tiled floors, which in turn opens into rooms fitted entirely with furniture of Sheraton and prints of Japan.

In Mr. Major's work exteriors indicate what is to be found inside, and the finish of his rooms is planned from the start. But his work does not stop in giving a definite note to the room; he keeps a guiding hand on its furnishing until a harmonious ensemble is completed and the room makes the perfect setting wherein the human drama may be happily played.

Not so easy this, because of three interferences: the unformed taste of the client, the clinging to hopeless old furniture, and the ever-increasing difficulty of finding fine old pieces which shall dominate the room and declare its taste and distinction. A study of the examples given of

Howard Major's interiors shows how successfully he meets obstacles.

His work has a certain buoyancy coupled with decision. While taking suggestions from the past he uses them in a way that is modern and original without injuring their beauty. It is noticeable that he likes to play with motifs of the more neglected old styles, the quaintness of the early nineteenth century. This is a fertile field in the hands of the enthusiast and one which is little understood.

There is, for example, the time of the First Consul. Exquisite restraint, delicate classicism are its chief characteristics as a style. It has a distinction, a patrician conservatism of great charm. Its relation to *le style Empire* is like that of the Primitives to artists of the Renaissance. A look at the doorway illustrated shows Mr. Major's way of using it in a formal corridor, and the detail of the dining room in the Beard house shows with what elegance a mantel may be emphasized and decorated with pilasters having beautiful capitals.

Somewhat of daring is his in reviving a certain old fashion, that of marbleizing; daring because there are those who remember, in certain Victorian houses, the 1860 revival of that very matter, atrociously done in paper of high glaze. But such memories are ghosts of a somber past, bearing no relation to Mr. Major's revival except to emphasize the gay hardihood with which he masters a matter on which others have failed.

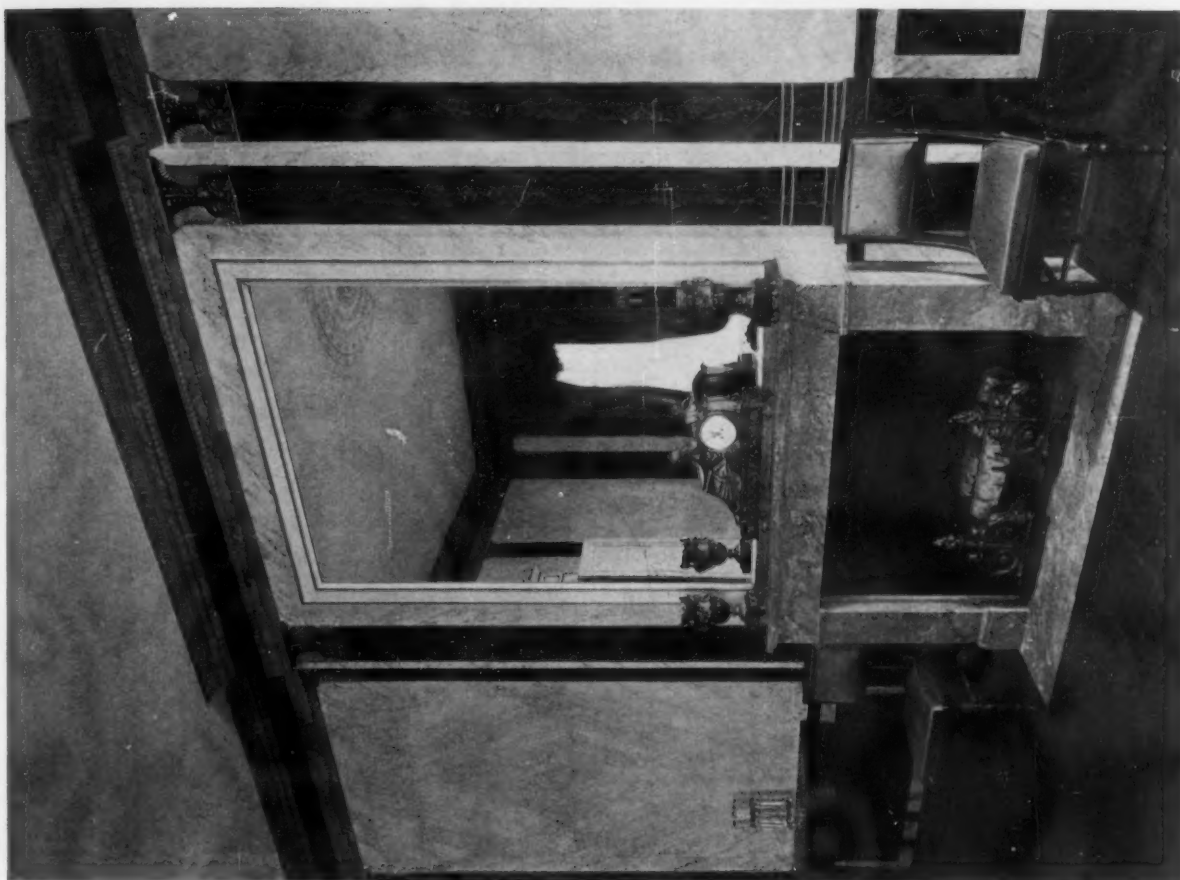
The present marble painting has a quality which real marble lacks, a softness and a lack of chill, Mr. Major says of it, and by means of special processes he gains these effects. The skilled workman of true artistic feeling is a *sine qua non* of the process. But it is with results that we are concerned, and it must be said that these are indeed happy. The quaint dignity of other days abides in the room thus treated.

In the dining room mentioned, the marbling covers all the walls in warm light tones. A base, chair-high, is formed of the two, black veined with color, and a light mixture like one of the Italian marbles. Were a dining room thus lined with real and glistening marble it were a chillsome place for hospitality. This was known to the decorators of the Directory, and hence they sought the dignity, the classicism

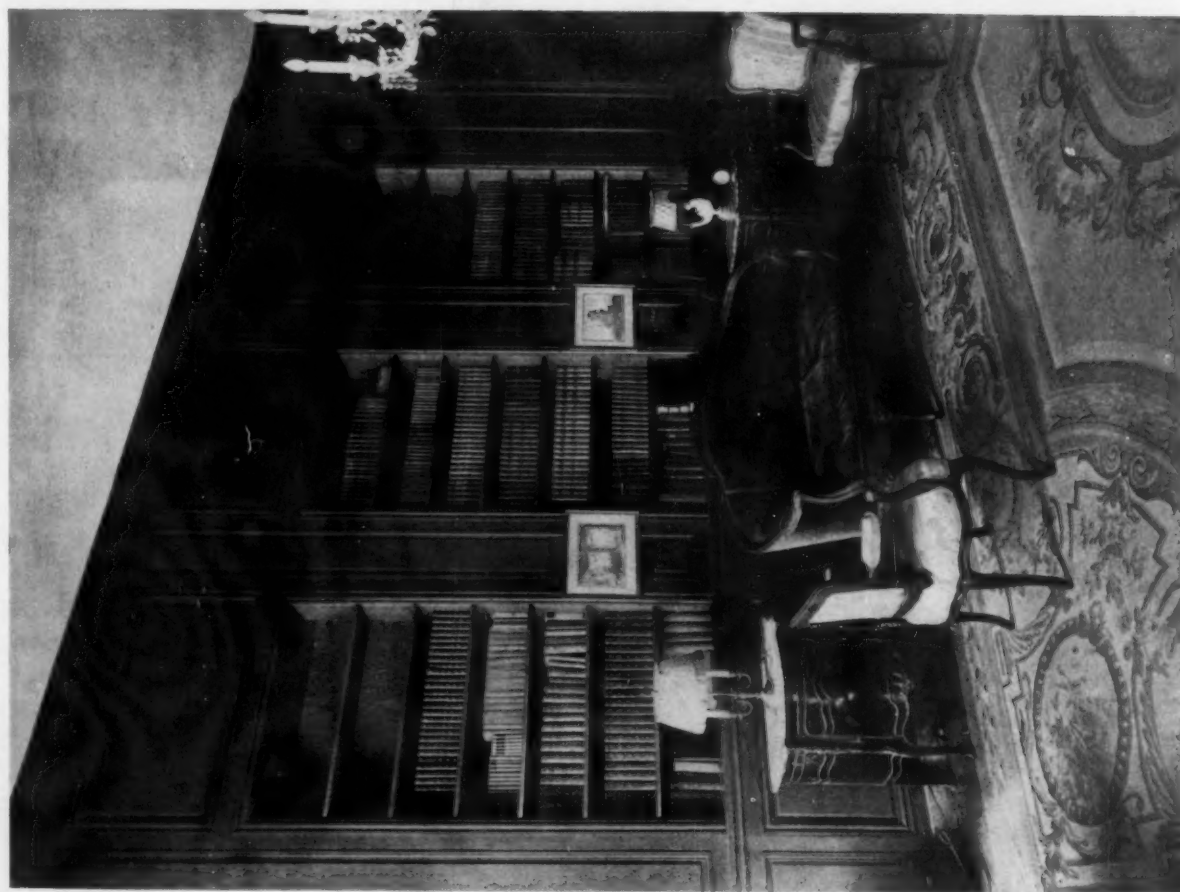


Dining Room Detail in the Frankel House, Brooklyn, N. Y.





MANTEL IN DINING ROOM



DETAIL OF LIVING ROOM

HOUSE OF WILLIAM BEARD, ESQ., WASHINGTON, D. C.  
HOWARD MAJOR, ARCHITECT

and the color of marble, but found a way to destroy its hardness and its chill by marbling the wood.

It is, however, desirable that floors should be hard, both in appearance and in reality, and Howard Major never hesitates to lay them in the old style of large checker-squares of alternating black and white. Could anything be more elegant or more highly appropriate for the modern dwelling where white woodwork abounds? A study of the hall in the house of Hugh Legaré, in Washington, shows it in clever use. Here it gives warmth, decorative balance and elegance. With white as the color for wood-trim, walls, ceiling and stairs, this display of heavy shading is a necessity cleverly met. It gives solidity to the ensemble. Also it takes the place of rugs, which the climate of Washington banishes for most of the year.

A play of alternation makes interesting this same hall, the employment of interchanging curve and angle in the openings, as for instance the generous rounded arch of the passage in juxtaposition to the square-topped doors. This same play is seen elsewhere in his work, notably when fitting a colonial room with arched doors to make a composition with the mantel, to fill the entire end of a room in which other doors and windows are rec-



Overmantel in the House of Hugh Legaré

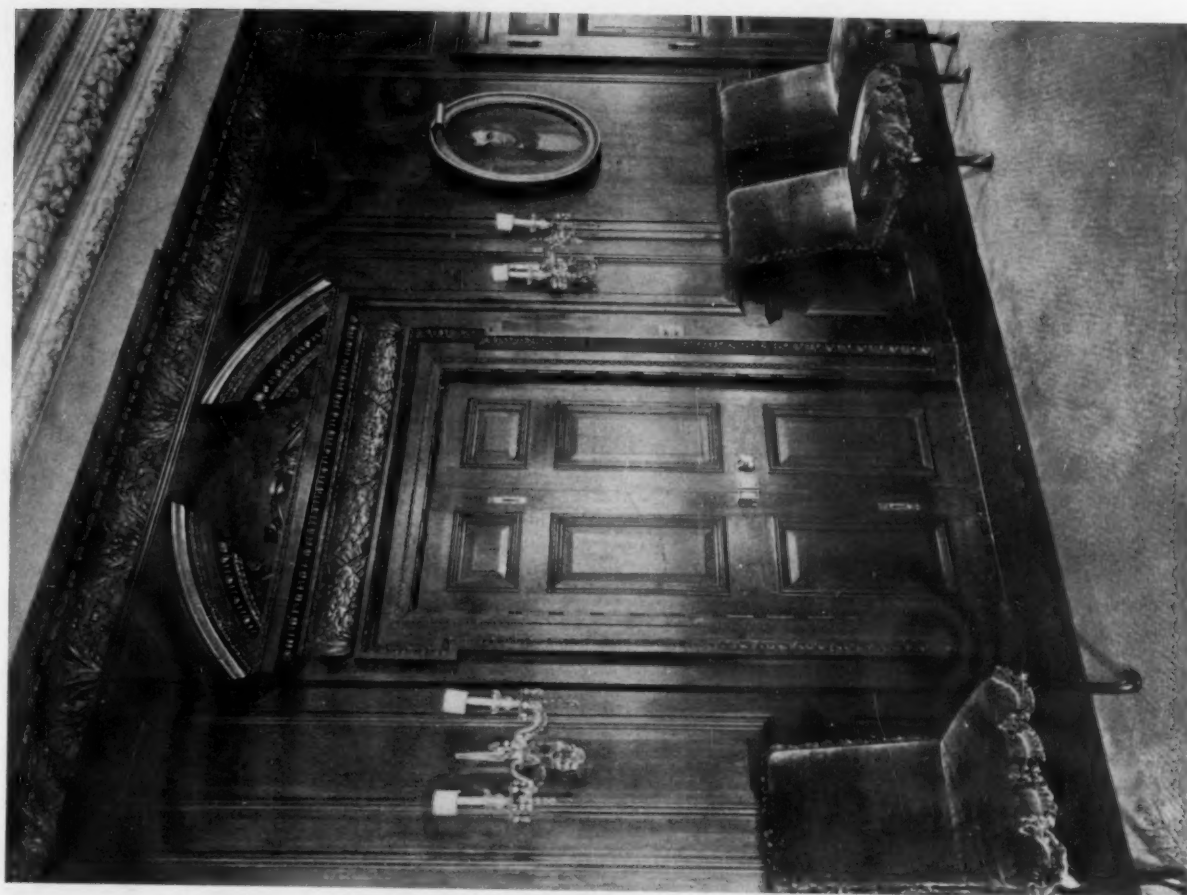


Doorway in the Frankel House, Brooklyn, N. Y.

tangular. That it is done with harmonious effect proves an able pencil.

The use of the arch as a corrective to too much angularity is a frequent resort in other ways; for example, there is the return to that graceful repository, the niche. It is made the central motif to the overmantel, where it offers hospitality and protection to some cherished work of art, a large group of Saxe, a Claudian marble, or a tall, serene Kwan-Yin with curving draperies of *blanc de Chine*, those draperies too often victimized when abiding in a less protected haven. Not only over the mantel does the niche throw its arch, but on either side of it, or on either side of the door in an entrance hall, as was done in the eighteenth century, and never does it fail to lend grace and interest in contrast to the straight lines usual in all rooms. It is remarkable that more architects have not revived this delightful expedient. Possibly, in these days of sham, our walls are made too thin to permit the hollowing out.

The value of the doorway as a decoration is not forgotten in Mr. Major's work. He regards these necessary openings as fields whereon a designer



DETAILS OF ENTRANCE HALL AND DINING ROOM, HOUSE OF HUGH LEGARE, ESQ., WASHINGTON, D. C.  
HOWARD MAJOR, ARCHITECT



may play with all his erudition and some of the quality of imagination. Versatility declares itself in the illustrations given. In the dining room of Mr. W. T. Grant, at Pelham, the doors are delightfully accented with the simpler form of the broken pediment, that decoration so dear to the serious instincts of Christopher Wren. Width of openings is a necessity to the proportions—and who does not love a wide door with a suggestion of spaciousness?

In a grander manner the broken pediment throws its severed arch across the top of the door in the dining room of the Legaré house. Old houses of London come to mind, and manor houses set in umbrageous parks in stage-coach days, also the talent of Wren, which the devastation of 1666 forced into a prolific flowering. Heavy shadows and high lights come by reason of moulded members, egg and dart, the bound wreath, all familiar but all re-assembled for modern use. Beadings and acanthus tips follow the lines to the floor, but, with apt restraint, the door itself and the wall panels as well, are left without ornament.

Mr. Major has gone to the early years of the nineteenth century for the door of the Frankel house. Its lines and proportions show the simplicity which comes only with study and ability. The door frame surrounds the door in unbroken design, but originality and elegance are achieved by the over-door. This smacks of the doctrine of elimination and of chastity in art which prevailed in France under the First Consul, and which found its English expression under the Brothers Adam.

A row of alternated urns is placed between triple uprights, the whole capped by a heavy moulding with reveals extending beyond the door panels. Nothing could be simpler, yet nothing more refined and eloquent of taste. Mention has already been made of the arched door piquantly placed with square openings, but these are often fitted with a carved keystone after the ancient manner, a certain happy reminiscence.

It goes without saying that Howard Major gives study to his mantels. Where possible, he uses them as the center of a decorative scheme which occupies all one wall. On either side he places pilasters, as in the dining room of the Beard house. In this case the pilasters are repeated in the corners of the room, which, with the dado, make panels of the wall space. The living room of the same house being finished in wood paneling, the mantel falls naturally between the panels, the curving corners adding a touch of interest. With fine intent the mantel of the Legaré house is true to type, without shelf and fitted above with highly decorative carved garlands; but in this the effect is hurt by the proportions and by failure to catch

just the right spirit in the carvings, so that one feels an incongruous mixing of flavors, a meeting of two differing talents, as though Grinling Gibbons were shaking hands with the carvers of Louis XVI, and neither in accord with Wren, who stiffens the background. Perhaps this criticism shows an exaggeration of values, but of perfection in little things is made the quality of good taste.

One more charming feature must be mentioned. It is the introduction, wherever possible, of bookcases which form a part of the scheme of the room. They are set in the walls so that the backs of the books on the shelves are flush with the panels framing them. This savors of the elegant fashion in *boiserie* under Louis XV, yet is executed with a simplicity which makes its appeal to the practical. The bookshelves may fill the spaces on either side a mantel-breast, flush with that section, or they may fill an entire side of the room. And even those to whom books mean only bindings acknowledge the fine decorative quality of well-filled bookshelves.

This brief review must show that an admirable instinct for making of an empty room a finished architectural problem appears in all Mr. Major's work. This simple statement proves his talent as a decorator as well as an architect. It is the fault of many an architect that he leaves the interior blank, characterless. It is then the province of the owner to make it what he likes, without the co-operation of the man who planned it and who knows better than any others with what it should be decorated. An architect has but half finished if he has not completed each room, wall by wall. To this he should add suggestions as to the kind of furniture and hangings the completed room might have. If a professional decorator is given the work, then for his own sake the architect should establish friendliness with this new element and introduce suggestions through this medium.

Rivalry between architect and decorator is untenable. Both are working for the same end, and co-operation displaces rivalry. It is undeniable that the architect has usually had a more profound study in design than the usual decorator, therefore he is in a position to avoid certain errors in assembling in rooms where miscellany prevails and to avoid errors in style where a style is determined. The decorator, on the other hand, is one who knows better the market for fabrics, the choice of colors, the fashion in carpets, the price of furniture, and a thousand details that express taste and try the patience. Therefore the result is happy when architects like him whose name heads this article finish artistically the interior of the human dwelling and carry their interest so far as to co-operate with the decorator.



DETAIL OF ENTRANCE

HOUSE OF A. K. WAMPOLE, ESQ., GUILFORD, MD.

MOTT B. SCHMIDT ARCHITECT

100

100





VIEW OF MAIN FRONT

HOUSE OF A. K. WAMPOLE, ESQ., GUILFORD, MD.  
MOTT B. SCHMIDT, ARCHITECT

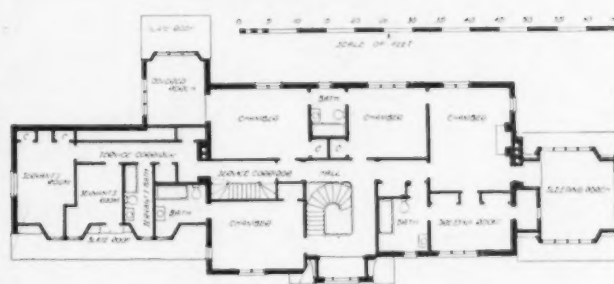
1880  
1881  
1882  
1883  
1884



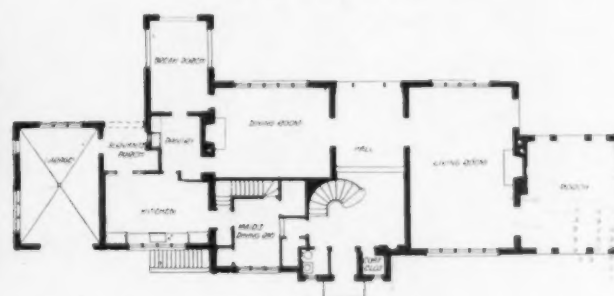
VIEW FROM GARDEN



DETAIL OF STAIRWAY



SECOND FLOOR PLAN



FIRST FLOOR PLAN

HOUSE OF A. K. WAMPOLE, ESQ., GUILFORD, MD.

MOTT B. SCHMIDT, ARCHITECT



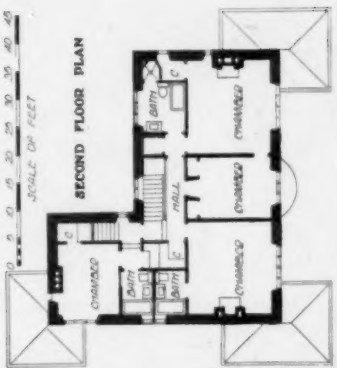
100



LIVING ROOM AND DINING ROOM MANTELS  
HOUSE OF A. K. WAMPOLE, ESQ., GUILFORD, MD.  
MOTT B. SCHMIDT, ARCHITECT

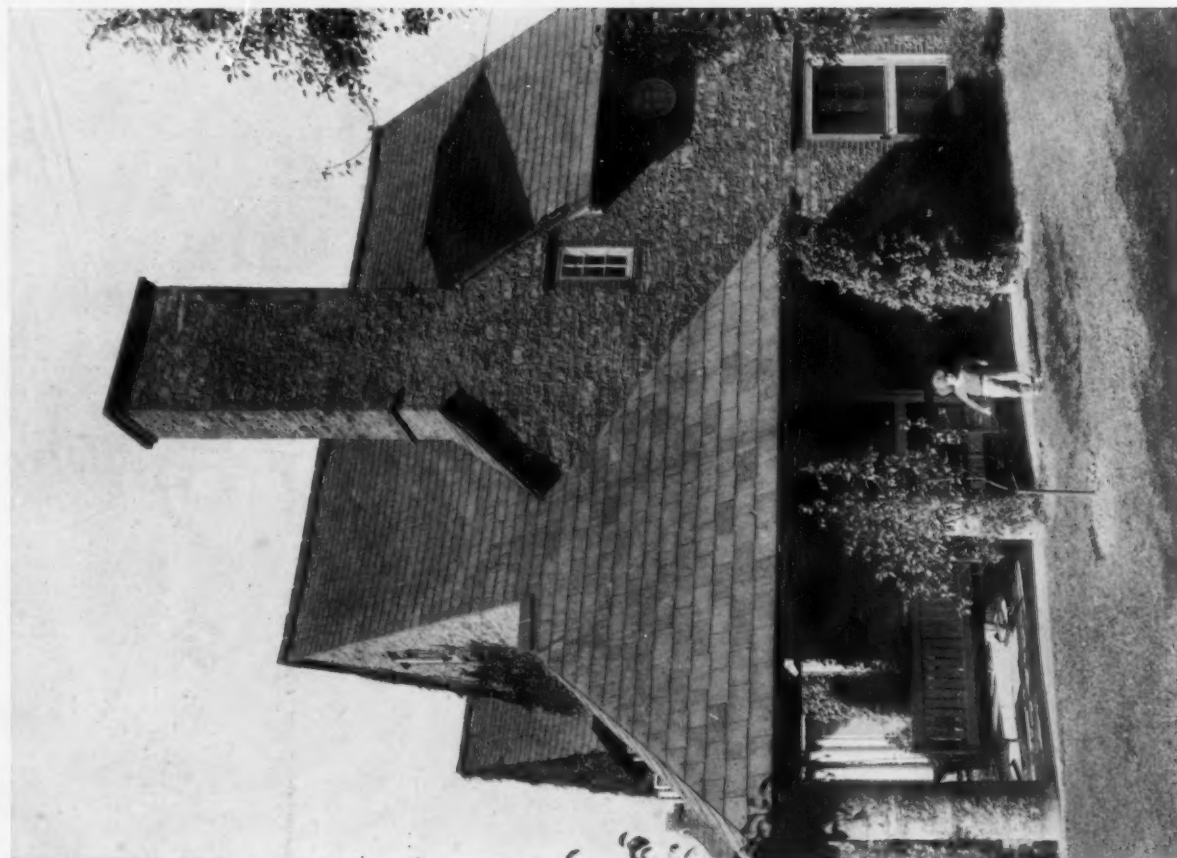
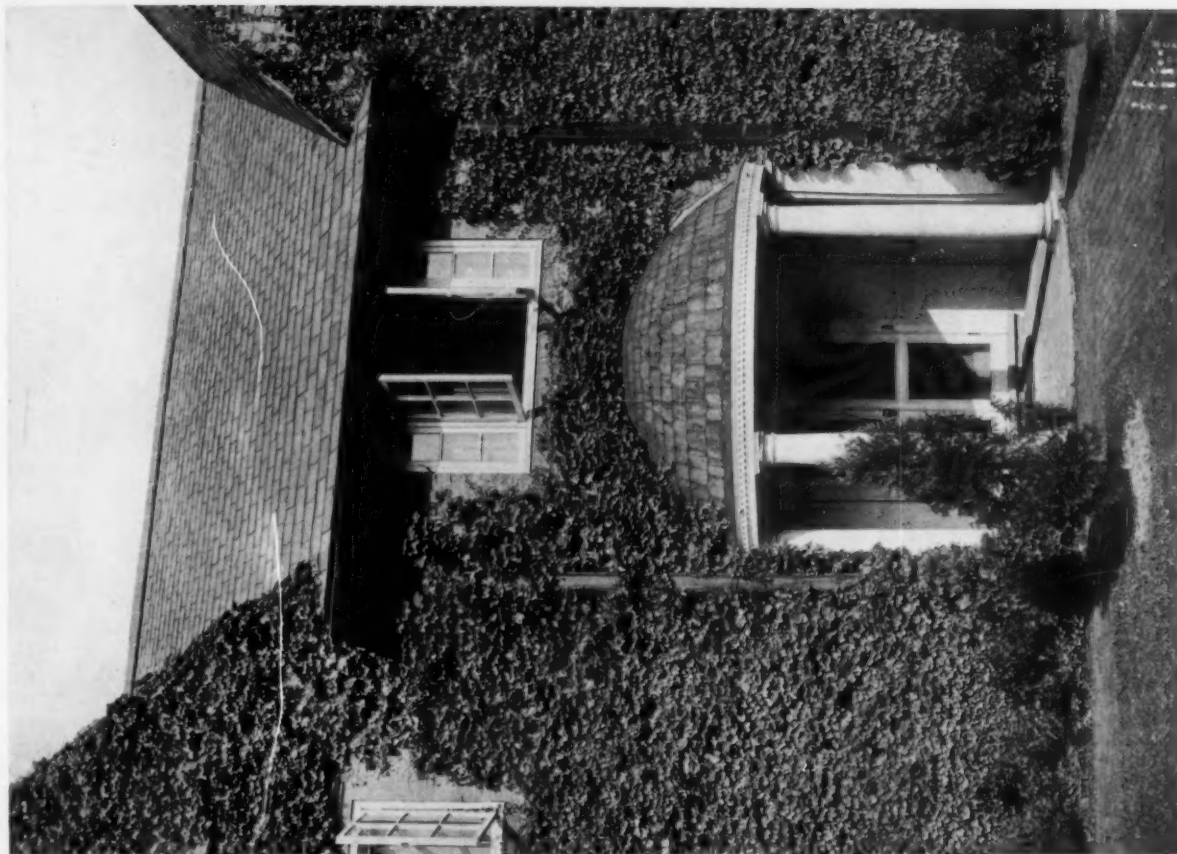
100000  
100000  
100000  
100000  
100000





HOUSE OF DAVID W. MILLER, ESQ., EDGEWORTH, PA.  
HENRY D. GILCHRIST, ARCHITECT

THE  
NEW  
YORK  
PUBLIC  
LIBRARY



DETAIL OF PORCH AND ENTRANCE DOORWAY  
HOUSE OF DAVID W. MILLER, ESQ., EDGEWORTH, PA.  
HENRY D. GILCHRIST, ARCHITECT



1871

1871



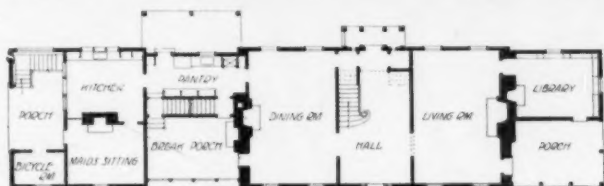
VIEW OF MAIN FRONT

HOUSE OF ROYAL S. GOLDSBURY, ESQ., EDGEWORTH, PA.

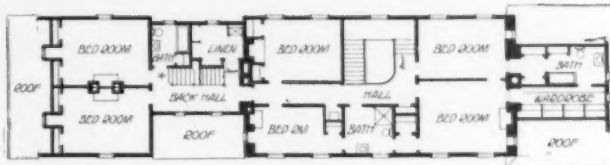
INGHAM & BOYD, ARCHITECTS

1000  
1000  
1000  
1000  
1000





FIRST FLOOR PLAN



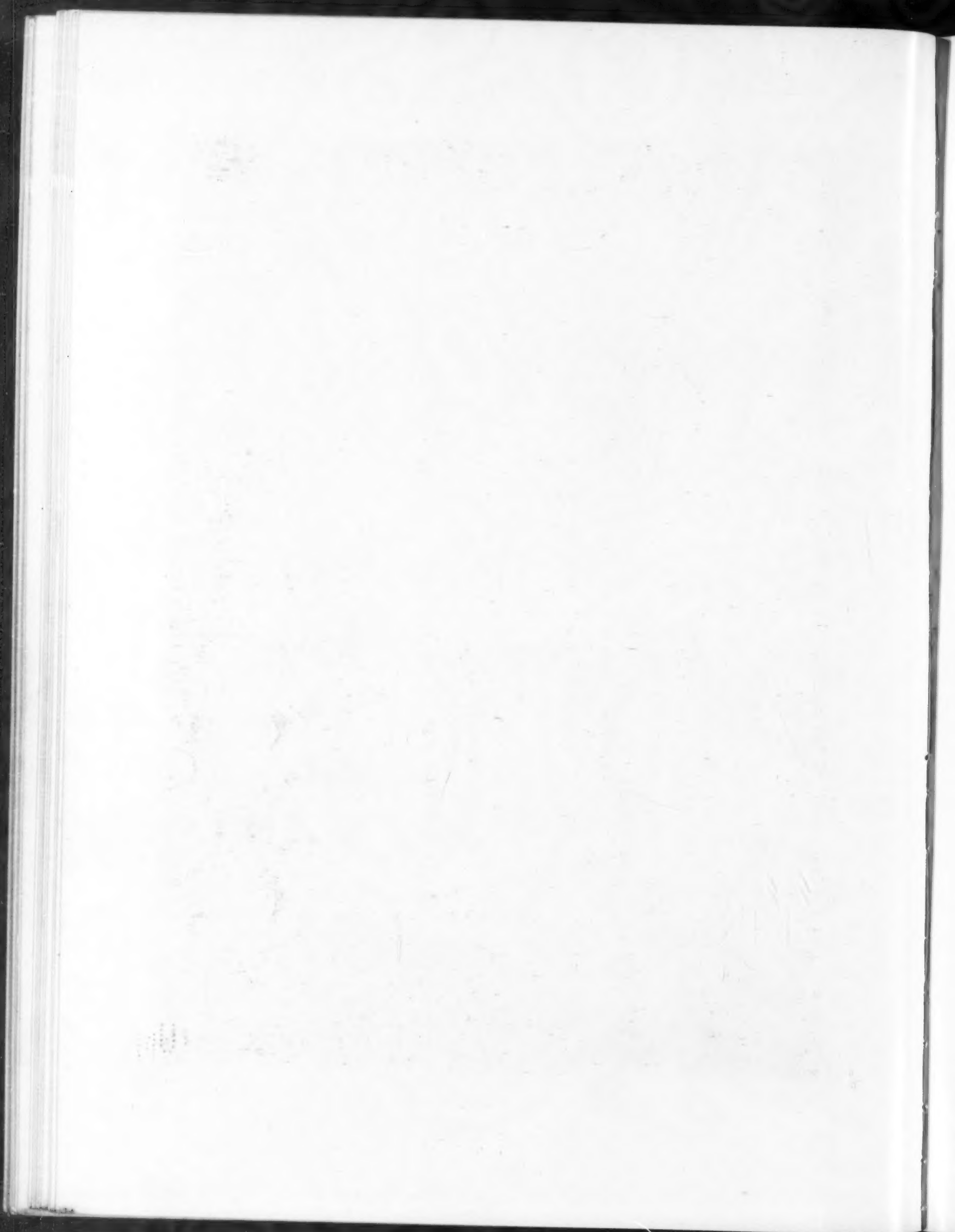
SECOND FLOOR PLAN



VIEWS FROM GARDEN LAWN

HOUSE OF ROYAL S. GOLDSBURY, ESQ., EDGEWORTH, PA

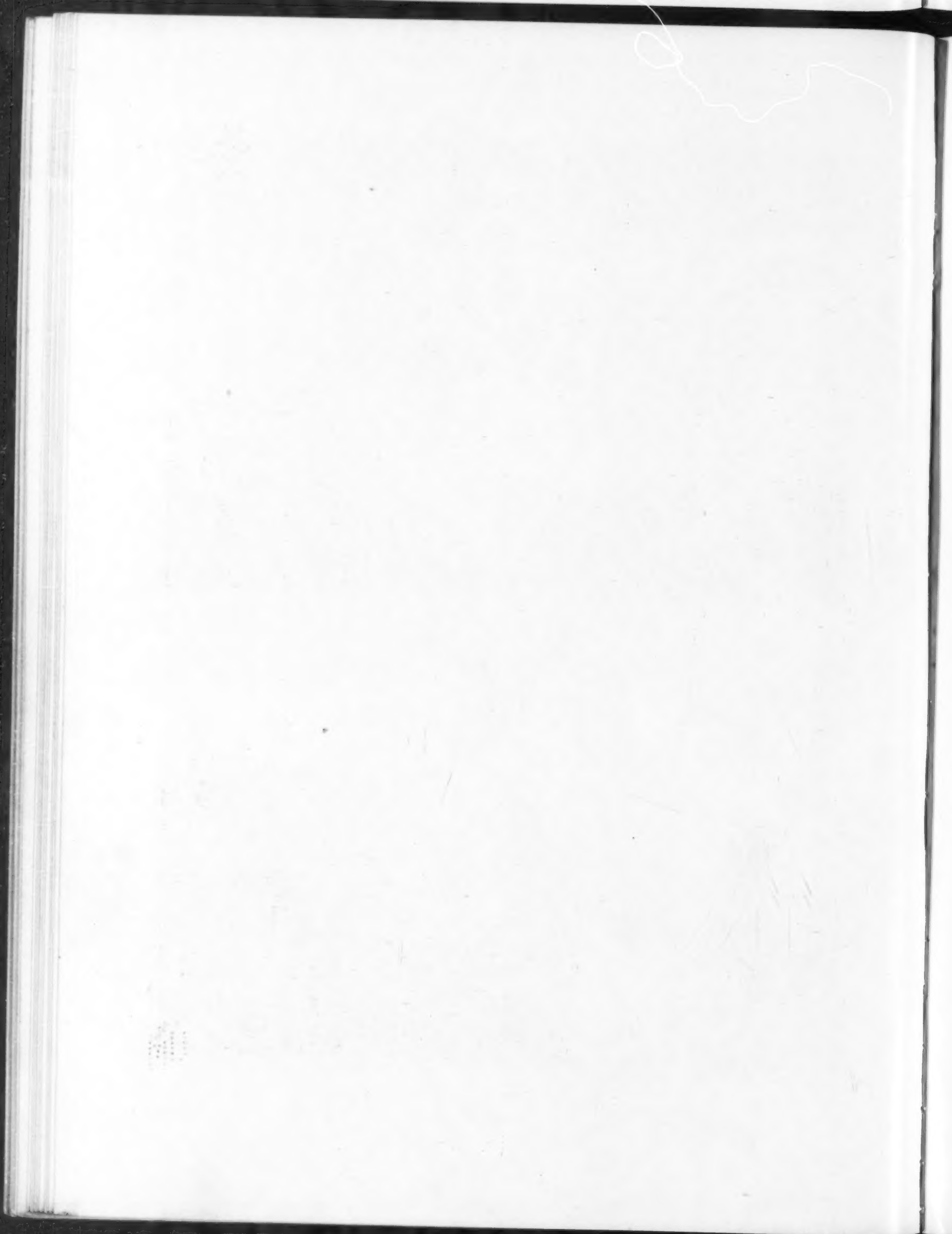
INGHAM &amp; BOYD, ARCHITECTS





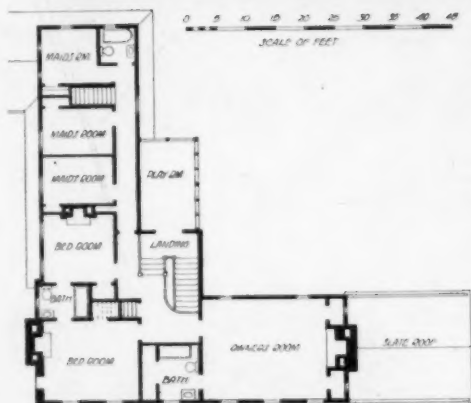
DETAIL OF ENTRANCE DOORWAY  
HOUSE OF MRS. FITCH, EDGEWORTH, PA.  
INGHAM & BOYD, ARCHITECTS



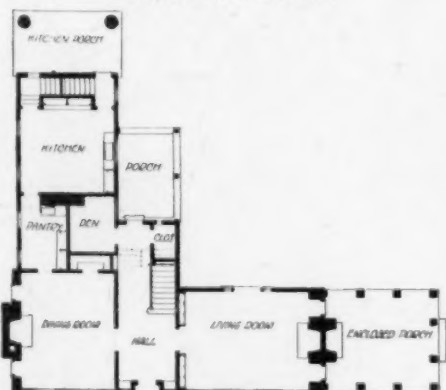




GENERAL VIEW



SECOND FLOOR PLAN



FIRST FLOOR PLAN



VIEW TOWARD LIVING PORCH

HOUSE OF MRS. FITCH, EDGEWORTH, PA.

INGHAM & BOYD, ARCHITECTS

31

32





VIEW TOWARD SERVICE WING



VIEW OF ENTRANCE FRONT



SECOND FLOOR PLAN

HOUSE OF CLARKE PAINTER, ESQ., EDGEWORTH, PA.

INGHAM & BOYD, ARCHITECTS



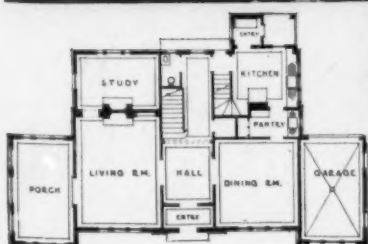
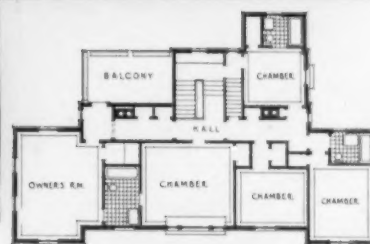
FIRST FLOOR PLAN



10000  
10000  
10000  
10000  
10000



VIEW OF MAIN FRONT AND SECOND FLOOR PLAN



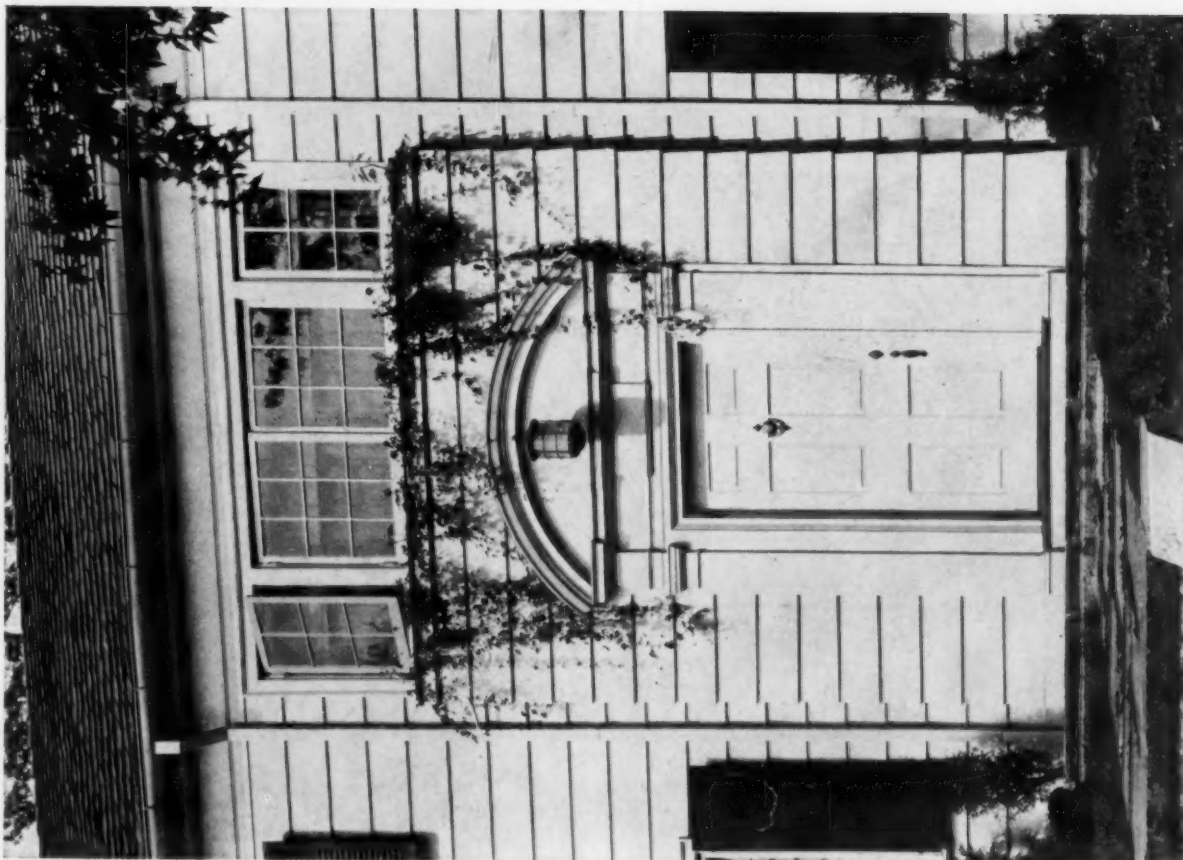
FIRST FLOOR PLAN AND VIEW AT REAR OF LIVING ROOM END

HOUSE OF JOSEPH E. BUSH, ESQ., FIELDSTON, N. Y.

DWIGHT JAMES BAUM, ARCHITECT



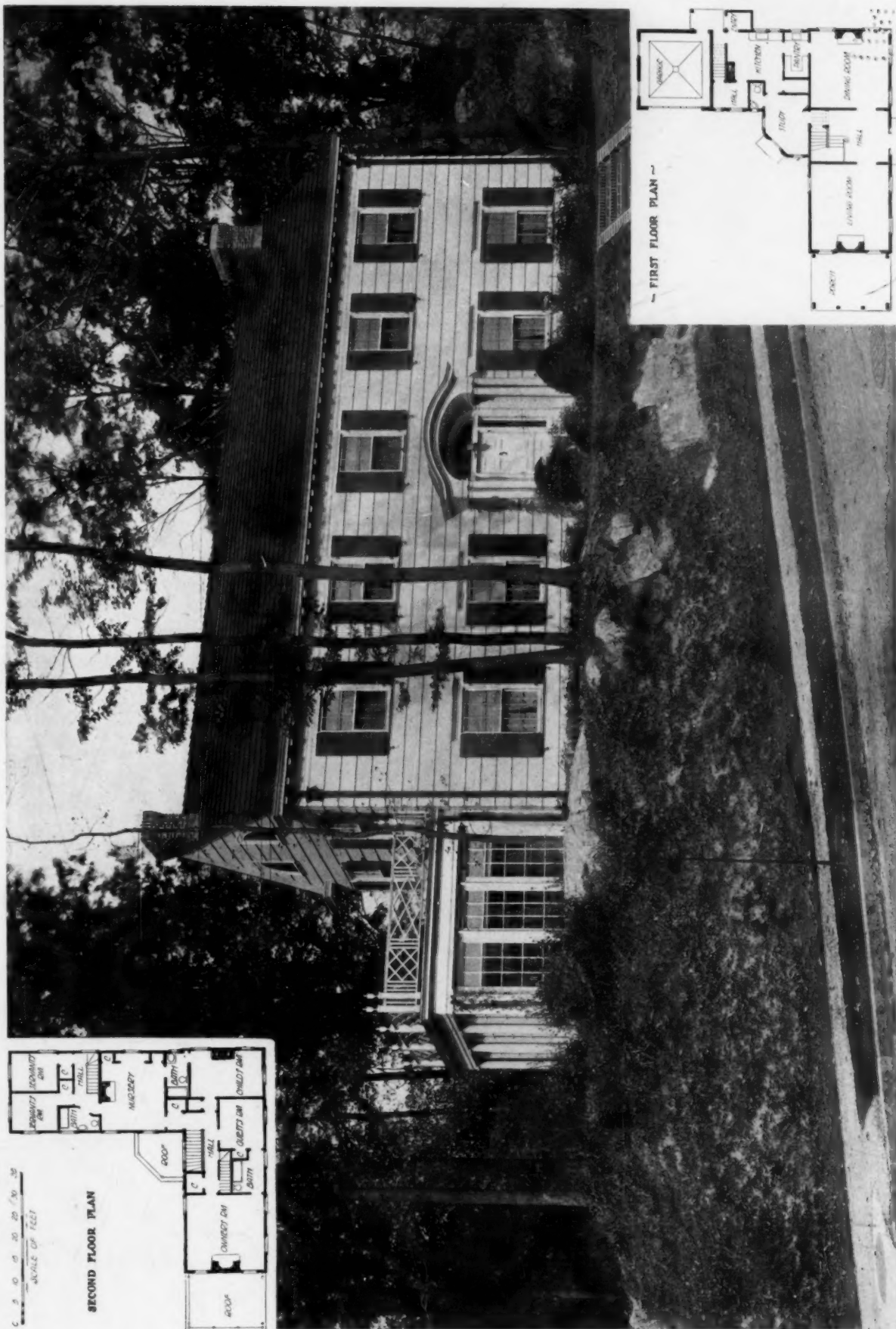
100



DETAIL OF PORCH FRONT AND ENTRANCE DOORWAY  
HOUSE OF JOSEPH E. BUSH, ESQ., FIELDSTON, N. Y.  
DWIGHT JAMES BAUM, ARCHITECT

100





GENERAL VIEW

HOUSE AT RIVERDALE-ON-HUDSON, N Y  
DWIGHT JAMES BAUM, ARCHITECT AND OWNER

PRINTED  
AND  
PUBLISHED  
BY  
J. H. B. & CO.



VIEW OF STUDY ENTRANCE AND SERVICE WING



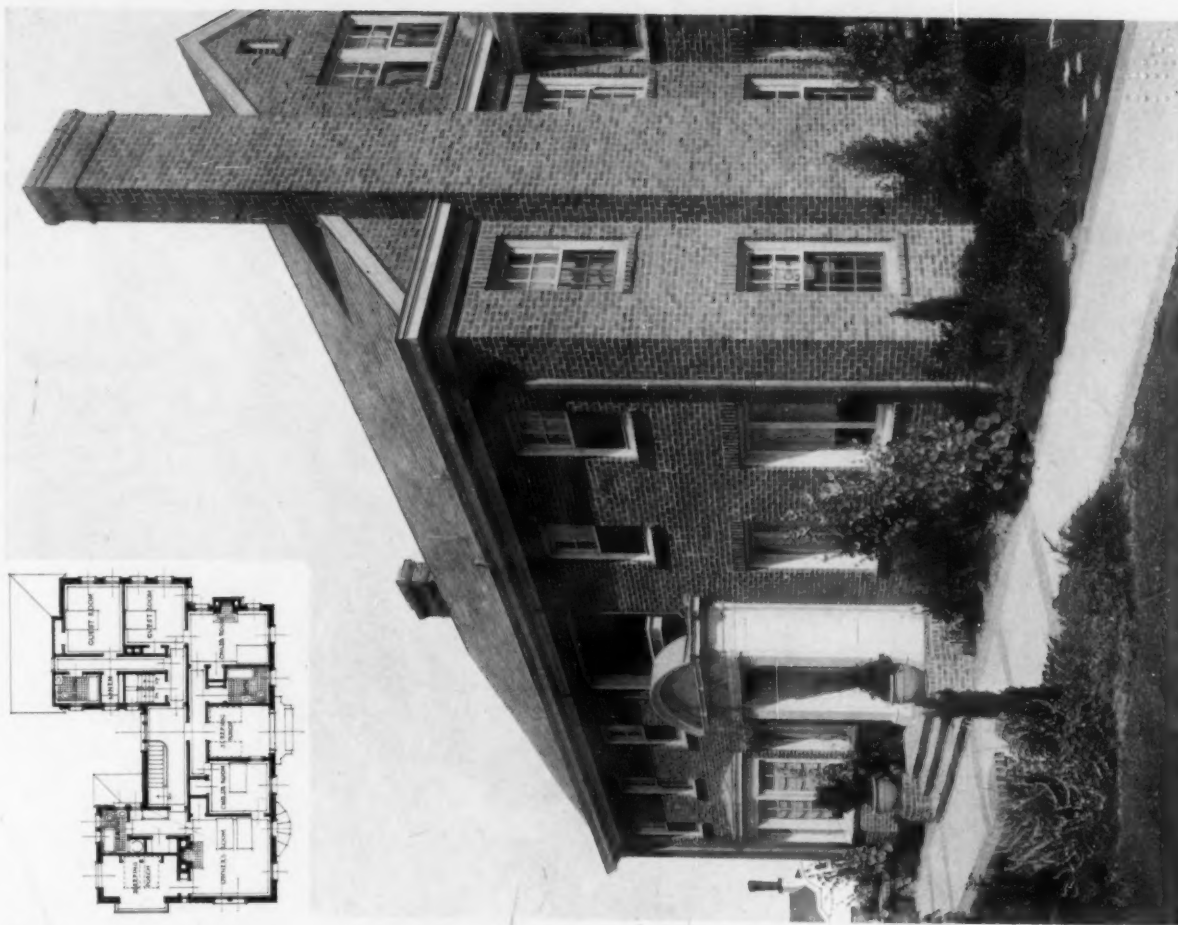
ENTRANCE HALL

HOUSE AT RIVERDALE-ON-HUDSON, N. Y

DWIGHT JAMES BAUM, ARCHITECT AND OWNER



1000  
1000  
1000  
1000



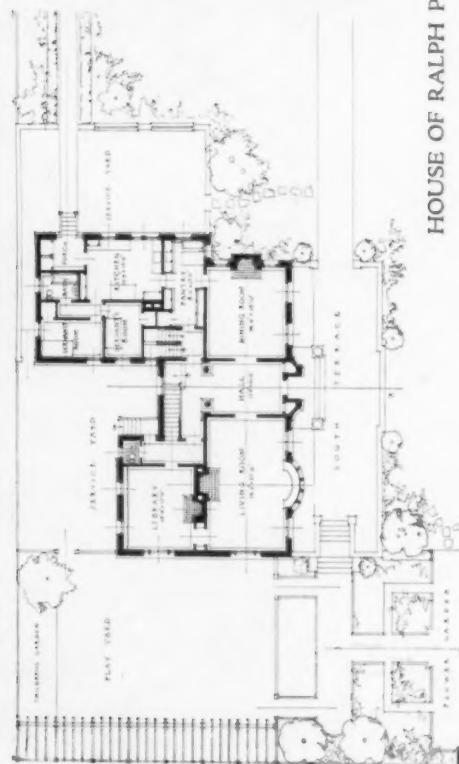
VIEW OF ENTRANCE FRONT

HOUSE OF RALPH P. MERRITT, ESQ., BERKELEY, CALIF.

WILLIAM C. HAYS, ARCHITECT



DETAIL OF SOUTH TERRACE



100  
100  
100  
100



## Some Interesting Country House Alterations

By LEWIS E. WELSH

IT IS a curious fact that the type of work most disliked by architects should, at the present time, be the work which is in peculiar demand by clients and is most easily done under the present stringent conditions in the building industry. Due to the prevailing high prices and scarcity of labor and materials, the alteration of old buildings has developed surprisingly and holds many possibilities.

A few years back it was supposed, and probably correctly, that the average old building had little or no value, and that it was cheaper to tear down and start over again than to make alterations. This idea was shared not only by architects and builders but by the owners themselves, and most architects were only too glad to advise their clients to follow that course. In this way much of the original Colonial work of lesser size, but neverthe-

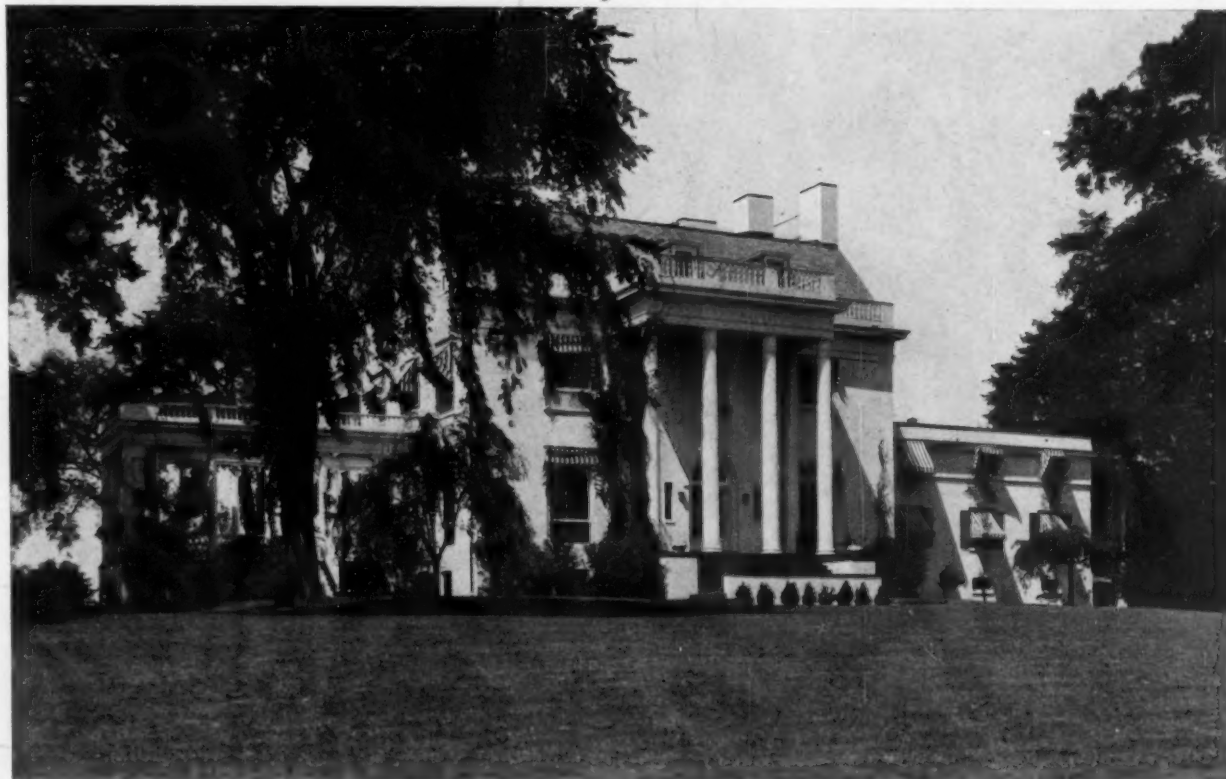


The F. P. King House before Alterations

less of distinct architectural beauty and material value, was ruthlessly destroyed. It is, perhaps, unfair to say that the architectural profession was responsible for this, but it does seem as though with a little more foresight and study a large percentage of this loss could have been prevented. The value of these old masterpieces of architecture is easily seen, and their restoration and revitalization is not a difficult architectural problem, but is more often a study in archeology.

The real laurels are for the man who is able to see the latent possibilities of the Victorian buildings, and who can reform and bring back into the fold these notorious prodigals.

The glaring faults of the Victorian houses are only equaled by the temerity of the architects in selecting styles of which they had so little knowl-



House of F. P. King, Esq., at Irvington, N. Y., after Remodeling  
Aymar Embury II, Lewis E. Welsh, Associate Architects



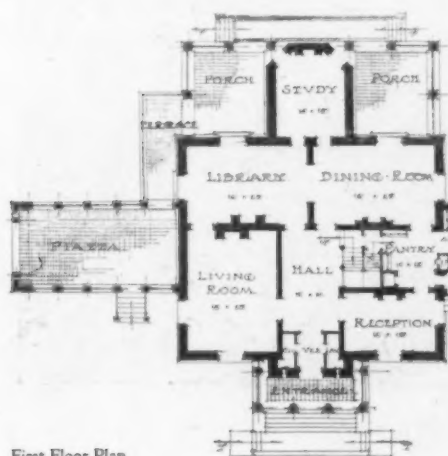
Detail on Piazza Wing of the King House

edge. For example, we find them applying the Swiss chalet type to the large house of a country estate. It is apparent that the effect of this is to neutralize the natural charm of the Swiss style and dwarf the stately proportions of the building, the result being an insignificant and decidedly commonplace piece of architecture. The residence of Mrs. F. P. King at Irvington, N. Y., was built about fifty years ago and had the above mentioned unfortunate beginning. Two years ago it was decided to reconstruct the building, keeping the in-

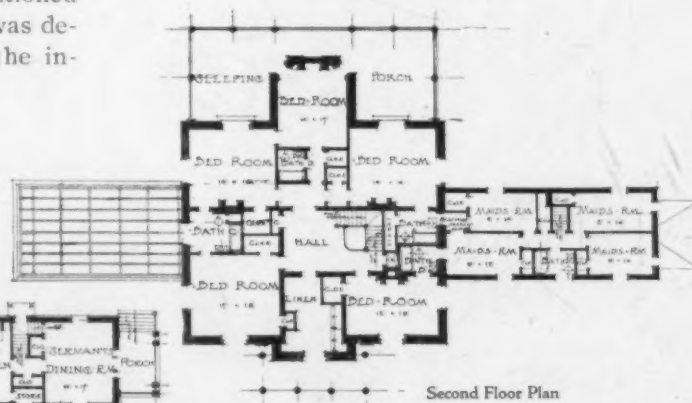
terior arrangements very nearly intact. Present day needs demanded new service quarters, which could not very well be placed in the main house, so a service wing seemed essential. As it was impossible to build this wing in the same style as the house, it was decided to change the exterior of the whole building. The house was so covered with jig saw projections, brackets, balconies and porches that there was nothing about it which suggested a dignified and appropriate style. Upon closer inspection it was found, however, that the house had well balanced proportions and simple lines entirely hidden from casual view by the badly designed details. It was decided to tear off the roof and carry up the end walls, putting on a gambrel roof in order to get additional rooms in the third story. All this work was done without cutting the masonry walls.

On the entrance side and on the river side there are projections which have been masked by a column treatment. The river side projection divided the porches and these were carried far enough to enclose the entire projec-

tion. The original house was covered with old and valuable wistaria vines, which were carefully removed from the house and supported during construction on heavy poles set for the purpose. This was neither an expensive operation nor a difficult one, but the value to the reconstructed building cannot be overestimated.



First Floor Plan



Second Floor Plan

House of F. P. King, Esq., at Irvington, N. Y.  
Aymar Embury II, Lewis E. Welsh, Associate Architects

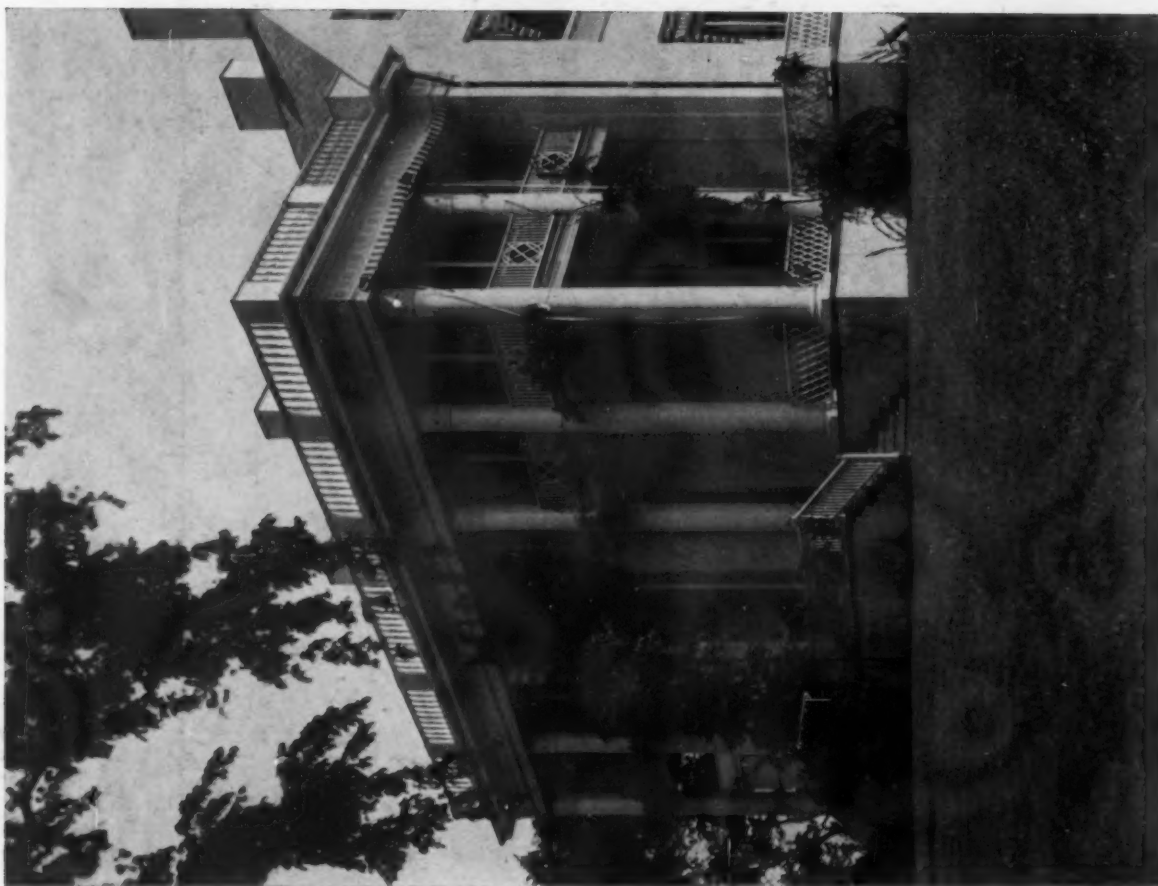


DETAILS OF ENTRANCE PORTICO, HOUSE OF F. P. KING, ESQ., IRVINGTON, N. Y.  
AYMAR EMBURY II, LEWIS E. WELSH, ASSOCIATE ARCHITECTS





DETAIL OF REAR PIAZZA  
HOUSE OF F. P. KING, ESQ., IRVINGTON, N. Y.  
AYMAR EMBURY II, LEWIS E. WELSH, ASSOCIATE ARCHITECTS



DETAIL OF NEW PIAZZA WING  
HOUSE OF F. P. KING, ESQ., IRVINGTON, N. Y.  
AYMAR EMBURY II, LEWIS E. WELSH, ASSOCIATE ARCHITECTS



House of Harry Michaels, Esq., before and after Remodeling. Alfred Busselle, Architect

A very different problem was presented by the house of Mr. Harry Michaels, near Ossining, N. Y., remodeled by Alfred Busselle. The house was built by Dutch settlers and had considerable charm in mass and detail, but was too small for practical purposes. Almost no alterations had been made to the exterior, except the addition of two very bad dormers. As in most of the Dutch houses, the second story was of little value, but the addition of a long dormer, usually so hideous, turns an attic into perfectly usable rooms. This dormer has been so cleverly handled, by keeping the roof projection small and by staining the vertical shingle surfaces the same



Entrance Detail of the Remodeled Snyder House

as the roof, that we hardly realize its presence. By comparing the "before and after" photographs of this house it will be seen that the new rear wing, while fully as large as the house, has been suppressed as much as possible in order to emphasize the old portion. The addition of the sleeping porch only slightly above grade on the hill side of the house forms a splendid connection between old and new work. It is always well when joining up with old work to cover the connection with a projection at right angles or by changing the plan of the elevation. Changes in scale as well as material or construction are often overcome in this way. The simple arbor



Views of the Snyder House before Remodeling



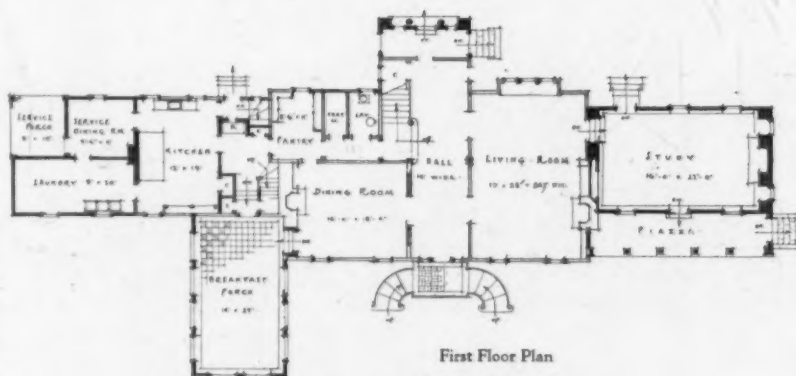
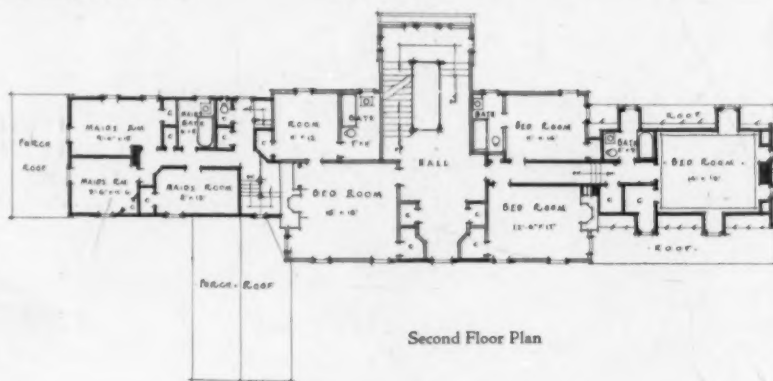
Study Entrance and Plans, House of Louis Snyder, Esq., Rye, N. Y.

of the Michaels house is a successful attempt to widen the existing narrow porch and again shows the care which Mr. Busselle has used in preserving the original roof lines.

It seems strange that architects should be called upon to remodel houses only twenty years old, when we take into consideration that twenty years is hardly a fifth of the lifetime of the average house. Surely our standards of taste and design change quickly to require alterations almost at the beginning of the life of a building. The Louis J. Snyder house at Rye, N. Y., while it had not fallen into bad repair, was a typical example of the pseudo-Colonial of 1900, when to build a Colonial house all that was necessary was unpainted shingles and white trim. Few of these houses were simply built and in most cases the effects of the Victorian styles are still found. In the Snyder house

more space was required for sleeping rooms, so a wing was decided upon, and, as the house was located on a knoll, it seemed best to make this addition at a lower level, thereby following the contours of the ground. The wisdom of this course can be seen in the photograph, as the stilted appearance is almost entirely overcome. The dormers on the original house presented an interesting problem, as there has been no change made to the structure or roof lines, the entire change being in the exterior trim and cornice, which are new. The plaster on the interior was not disturbed during the progress of the work. Most of the exterior changes were made necessary by the tearing off of badly orientated porches.

The success or failure of alterations is dependent almost entirely upon the architect's ability to see value or possibilities in existing buildings. Even the much despised Army buildings are coming in for a new use. One architect has been asked to take one of the buildings and attach it to a clubhouse in New Jersey, and the result seems to be as successful architecturally as it is financially. Surely there are no buildings which cannot be redeemed if these uninteresting examples of hasty construction can be improved.



Aymar Embury II, Lewis E. Welsh, Associate Architects





TWO VIEWS FROM THE GARDEN LAWN  
REMODELED HOUSE OF LOUIS SNYDER, ESQ., RYE, N. Y.  
AYMAR EMBURY II, LEWIS E. WELSH, ASSOCIATE ARCHITECTS



VIEW OF ENTRANCE FRONT



NEW STUDY WING FROM GARDEN SIDE  
REMODELED HOUSE OF LOUIS SNYDER, ESQ., RYE, N. Y.  
AYMAR EMBURY II, LEWIS E. WELSH, ASSOCIATE ARCHITECTS

# ARCHITECTURAL & BUILDING ECONOMICS DEPARTMENT

C. STANLEY TAYLOR, *Associate Editor*

---

## The Housing of Employees from an Industrial Viewpoint

**A**BOUT two years before the beginning of the World War some interesting predictions were offered by housing experts who had made a practical study of housing as an industrial factor. The most important and interesting prediction, based on a study of industrial centralization and home building statistics, stated definitely that within a decade manufacturers would be forced to give consideration to this problem—not from a paternalistic or even a welfare viewpoint, but because of the actual shortage of houses forecast by a rapid growth of population in various industrial centers.

At that time little significance was attached to the statements of these analysts, who might well be termed pioneers in their field. Manufacturers, even as they are to-day, were loth to enter the real estate business. With here and there an exceptional case of farsightedness, the question of housing was indefinitely tabled.

Suddenly the war developed a tremendous pressure on industrial production, and large contracts calling for a rapid increase of factory employment were placed with existing manufacturing plants, regardless of community conditions. The great volume of production suddenly called for at congested manufacturing points accentuated the evils of rapid labor centralization. As thousands of men attracted by high wages drifted to the war industries, they failed to find homes for their families and they drifted on, creating by far the greatest volume of "floating labor" ever known in this country.

Then came the period of more detailed study of this problem, its recognition by Congress, the formation of the United States Housing Corporation and the development of the Housing Bureau of the Shipping Board.

Then it was that popular appreciation of the wisdom of the pioneers who had predicted the importance of housing as a factor in production became evident. The press was flooded with articles on the subject of housing. Many theories were advanced and thousands of persons for the first time understood the meaning of that often maligned term—industrial housing. Like a great wave this interest rose higher and higher until the end of the war, when it broke and—in the minds of many—became almost a dead issue. Almost all there is to say on the subject has been

said and general interest in housing has turned definitely to community conditions involving high rentals and a general shortage of homes. This is not true of manufacturers' interests, however.

### Industrial Housing Problem Greater Than Ever

As a matter of fact, it is only since the war and at the present time, that the real problem of industrial housing is assuming a nationally important aspect and taking the place in our economic development long ago forecast by pioneer thinkers along this line. The condition which they expected would develop gradually has been greatly aggravated by the ascendancy of demand over production capacity, resulting from the sudden increase in foreign trade and the greatly increased buying power of the American public. At this time, more than ever before, general recognition of the importance of this problem is being evidenced by manufacturers in every part of the country and in unusually varied industrial lines. It is certain that the activity of supplying homes for employees is only now in its infancy. The next few years must show great activity in employee housing as one of the basic problems of industrial production in the United States.

As homes are needed to insure increased production, it is evident that the buying public must pay for these homes as part of the cost of production; but as this payment must necessarily be spread over many years, it is evident that the manufacturer, however unwilling, must be the active financial agent. He must consider housing in the nature of plant investment, a point to be more thoroughly discussed in later paragraphs.

At this juncture there enters the perplexing question of the high cost of building, relief from which, we may safely assume, will not be found in many years, owing to the generally unbalanced condition of the building market. The manufacturer cannot turn, as in past years, to the speculative builder for relief from this burden of housing. The eyes of the speculative builder, who has money for financing, are turned, in higher aspiration, to the need for more expensive city and suburban dwellings where the margin of profit is greater. Bankers are not encouraging building, and the demand for building finance is drawing all available funds to fields of better collateral than that offered by small houses in industrial communities.



### The Dilemma of the Manufacturer

To-day, then, we find rapid growth in the number of manufacturers forced into the real estate business. Facing a series of almost paradoxical conditions, the answer to the housing question must be either yes or no—there is no relief to be gained by further "sidestepping." If the speculative builder is encouraged, the definite cost of the house to the employee (whether rented or sold) brings an instant demand for more wages. Exit the speculative builder! Manufacturing costs are already so high that most manufacturers must look to increased production as a remedy; but increased production means more men and often more manufacturing space. The provision of housing as a plant investment, therefore, becomes to many a forced issue. Unwillingly, then (speaking from the industrial viewpoint), we turn to a consideration of ways, means and results.

### The How and Why of Financing

The first natural question of the manufacturer involves the possibility of a direct financial return on money invested in employee housing. On this point no time need be wasted—there is no profit in housing, nor can an interest return be expected on any money used except that employed as first mortgage money. The problem must be approached inversely and from a production viewpoint. Will the profit which can logically be expected from the increase in production pay an indirect but definite return on this form of plant investment? Specifically, we may take the case of one New England textile manufacturer, whose mills are now at capacity of production, but who is in a position to sell a greater volume of his goods if he can produce them. His decision has naturally been to build an additional mill unit. With the town already suffering from an acute housing shortage and not enough home labor available to man the new mill, he has wisely inquired as to the housing problem. The answer in this case was definite and as follows:

"Mr. —, you have decided that the market for your goods will stand a plant investment of \$2,000,000 for a new mill unit. The profit is apparently sufficiently attractive for you to have made this decision. To man this plant you must build houses; there is no other way. If the same mill unit which you are figuring at a cost of \$2,000,000 costs \$3,000,000, will the margin of profit still represent a good percentage and one which would induce you to make this investment—\$2,000,000 to be spent on the new mill and \$1,000,000 on houses? If so, build the mill and the houses; if not, abandon the idea."

This represents one phase of the housing problem. Another phase involves the question of importing men in specialty lines of industrial work, individuals who are known to be good producers. Invariably one of the first questions will be:

"Can I find a house in your town?"

The natural question is whether or not the value of the services of these men is great enough to warrant a housing investment. Recently one of the great rubber goods manufacturers of this country was considering the question of spending a large sum of money on housing a small percentage of better class male employees. At the suggestion of a housing expert careful inquiry was made as to the actual volume of increased production which might be expected in the affected departments. It was found that in units of increased sales profit a good return could not be expected on the necessary investment. The idea of housing married men was, therefore, definitely abandoned. During the course of the investigation, however, it was found that a large additional unit of female employees would result in a definitely valuable production increase. Women not being available locally, the entire housing problem of that plant was found to center on the question of providing women's dormitories in order to attract the right kind of help. Thus, by the inverse and proper method of figuring the return from a housing investment, the real housing problem was unearthed.

### Can the Manufacturer Get His Money Back?

Like the average cold-blooded analysis this dissertation has, in the main, been discouraging up to this point. While it is true that industrial housing must be considered in the light of plant investment, it differs from the average financial unit of such investment in that a large part of the money so used is returnable if the operation is properly handled. In other words, we now approach the old problem of whether houses for employees should be sold or rented.

Unless the manufacturer can afford to keep a large sum of money tied up indefinitely, houses provided for employees should be sold to them on an easy payment basis. This constitutes another perplexing problem, aggravated by the high cost of construction. Houses to-day cost more than the average employee can afford to pay. The cheapest type of livable house costs \$4,500 as a minimum, and the houses which should be provided will cost from \$5,000 to \$6,000, without considering the cost of the land. To meet this condition a number of manufacturers are selling new houses at a loss of from \$1,000 to \$2,000, this amount being given to the employee as a

bonus, often payable in part at the end of five years (during which he has been in the employ of the company), and the balance at the end of eight or ten years.

During this time he has been making monthly payments on principal and paying interest on the first and second mortgages. The term "bonus" smacks of paternalism, and workmen of America, who after all are very human, do not thoroughly appreciate paternalism. After much analysis and no little experience we feel that the better plan is for the company to give the land (covering the fact by selling the house at a stated cost, which is really only the construction cost) and, under an easy payment plan, charging no interest on the second mortgage. In this manner the actual financial contribution of the manufacturer, an amount chargeable as general manufacturing cost, consists of:

Cost of land and improvements.

Interest on money advanced in the form of second mortgages, returnable over a period of ten or fifteen years.

On a house sold for \$5,000, these amounts will total about \$1,000, and the house can be sold to the employee at an actual cost of about \$35 per month, paid like rent, but actually amortizing so that at the end of ten years the employee owns the house subject only to a sixty per cent first mortgage.

Thus we see this form of plant investment in a somewhat new light and one perhaps more encouraging than at first glance. The position of the manufacturer is that he faces a direct financial loss of only the cost of the improved land. While he gets no direct interest on the second mortgage, he can realize that his indirect interest resulting from the provision of housing may all be credited to the use of the second mortgage money for this purpose. At the end of ten years he has received all of the money used as second mortgage money and during this period the first mortgage money has paid a nominal rate of interest or perhaps it has been transferred to local financial institutions or individuals, thus returning the principal amount.

#### The Employee's Viewpoint

This is a question in regard to which it is very difficult to arrive at conclusions. In the industrial field the selling of houses to employees on easy terms has so far been largely experimental and not always too well planned. We must, therefore, look to the larger human elements to determine the feasibility of this method of making such a plant investment largely returnable over a period of years.

All of us are human beings employed in the industries of the world. We do not all think in the same terms, but our conclusions are much alike when influenced by a given set of circumstances. Consequently, our subsequent actions are much alike. Thus, if we approach the analysis of this question in a simple, common-sense manner, our conclusions cannot be far from correct. As preliminary evidence we know that the instalment plan of purchase has been very successful in many lines—even in housing as developed by speculative builders in our larger cities. We know, too, that in one form or another we all pay rent.

With this logical beginning let us for a moment place ourselves in the position of the employee, the potential purchaser of a house. He is either employed at a fair wage, but has not a proper house for his family to live in, or he is considering a new place of employment. At one factory a good job is open, but no house is available—at another there is a job and a house—but he must buy the house. He learns that the house can be purchased for a small payment and monthly payments which represent so much cash going out each month just as he has always paid rent. Perhaps the payment is higher than he has been accustomed to. Well, he is getting value in having a place to live where the rent cannot be raised and where he cannot be dispossessed at the whim of a landlord. If the rent (monthly payment) is too high, perhaps there are two wage earners in the family. Certainly it is not difficult to figure whether he can afford to buy or not.

Again, he has the home-owning desire and can be shown that the cost of the house is fair. He knows what his neighbors are paying when they have purchased or rented under to-day's conditions. One important point, however, is this—suppose he loses his job in two or three years?

This is a point of which the manufacturer must take cognizance in his selling plan. He must be ready, in case a man wishes to leave town, to take the house back, refunding payments, but deducting a fair rental for the period during which the house has been occupied. There is also the question of insurance in case the wage-earner dies. This is usually cared for by the writing of group insurance such as that now carried by several large insurance companies and sometimes termed "home-purchase" insurance.

In general, the above paragraphs will give a fair conception of the workman's viewpoint. A few years ago, when the housing shortage was not so acute, the workman took little interest in housing operations. When asked his viewpoint, his answer was usually to the effect that the manufacturer would do better to raise his wages and let



him find his own house. In a manner, this state of mind has not changed, but the condition which has changed is the availability of houses. Nowhere can he find a modern house which can be purchased on such reasonable terms as those which the manufacturer is in a position to offer him. Realizing this condition, wherever the housing shortage is acute the higher wage slogan is not now commonly applied to the workman's opinion of housing. In most instances he is asking the manufacturer to build for him—not waiting for a house to be thrust upon him.

Without question the men who buy houses represent the cream of industrial employees, —thrifty, better workmen with more balanced judgment. If the man is not tied to the town by the escapable ownership of a house, organized labor does not object to housing, but rather encourages it.

It is safe to say that well designed and properly constructed houses, toward the cost of which the manufacturer has made some contribution to offset the high cost of building, will certainly be sold to the right workmen if the financial plan for selling is carefully worked out to keep the monthly payment as low as possible. In selling the houses the small amount of the monthly payment, rather than the selling price, should be stressed.

#### How Housing Is Being Provided To-day

The solution of the housing problem is being met in a practical manner to-day principally through the construction of houses financed by manufacturers or groups of manufacturers. In many towns throughout the country the Chambers of Commerce, Manufacturers' Associations or Boards of Trade are giving serious study to this question of industrial housing. In a number of towns, housing companies have been formed with equity financing by a group of manufacturers and mortgage financing agreed to by public-spirited local loaning institutions. In addition to this activity, many manufacturers are assisting employees financially in the purchase of existing houses or the erection of new houses on an individual basis.

In each of at least five cities over \$1,000,000 has been raised by subscription on the part of manufacturers, department store owners and others who will be directly benefited by increased community housing facilities. What the success of these large organizations is to be is somewhat problematical, but there is no apparent reason why a definite success should not be achieved if contributing members are willing to stand a certain percentage of loss, depending on the care with which designing and building is carried out. In the average town such co-operative activity is difficult to develop on

a really practical basis. It is evident that the growing housing problem will largely be solved by individual manufacturers building to meet their own needs.

Many details have necessarily been omitted in developing the facts given in this article. As its object has been principally to direct the attention of those interested to some of the changing conditions in the field of industrial housing, we shall be glad to give detailed information on any point under discussion.

#### The Problems of Design and Construction

After the general plan of developing employee houses has been worked out, the manufacturer is confronted with the selection of architects and builders. It can be easily realized that a project involving the design and construction of a large group of houses is far from simple and offers many more opportunities for errors of judgment and waste of money than does the average large building operation involving similar values. Certainly good architectural service is required in order that the houses may not only be designed to definitely meet the needs of the types of employees who are to be housed, but the designs must be economical in the efficient use of all space in the buildings and in the use of construction materials. They must be of a most practical nature from the builder's viewpoint, in order that the houses may be produced at minimum costs. It is, however, evident that houses of this character cannot stand too great an architectural overhead cost, but this can be kept comparatively low, owing to the fact that the same unit, with slight variations, may be repeated many times.

The construction of the houses should be good. The provision of cheap houses, with single flooring, paper roofs and other attempts at false economy is not only unfair to the purchaser but represents very poor business judgment. The manufacturer must not forget that these houses may come back on his hands in the course of years and that they represent actual collateral for loans which he has extended.

In selecting a builder it is well to choose one who has had considerable experience in the building of group housing. The problem is entirely different from that of the construction of a large building, and many contractors have come to grief or caused extensive losses to their clients by attempting to construct a housing operation on the system used for larger unit construction. The type of contract which can well be recommended for such a building operation is described briefly in the article on the following pages.



## Building Now—and the Logical Form of Contract

IT IS clearly recognized at the present time that high costs do not constitute the only difficult element in considering the advisability of proceeding now with the construction of buildings of various types, the plans of which are already prepared. Owing to unusual demand for what might be termed basic classes of building materials, there has been for some months a steady drain on available stocks. Production of building materials, in spite of strong efforts at stimulation, is greatly hampered by conditions of plant labor, transportation of raw material, coal shortage, lack of machinery and building space, and accidental conditions such as the recent flooding of the works at several hollow tile and brick plants.

In addition to a definite shortage of materials of many kinds, the problem of transportation has assumed formidable proportions. It is common experience on practically all large construction jobs to have carloads of necessary material held on railroad sidings at distant points, with the result that work is delayed at considerable added expense. In many instances, also, material dealers, having definitely agreed to deliver quantities of specified materials at quoted prices, are failing in deliveries owing usually to conditions beyond their control, but sometimes, we fear, being tempted by subsequent offers of spot cash at higher prices.

It is evident now that the bulk of construction, which will proceed in spite of the difficulties enumerated above, may be roughly divided into two classes:

(a) Construction necessary for increased industrial production.

(b) Construction necessary for increased community facilities.

Apparently a large proportion of construction planned on a purely investment basis will be abandoned to await more favorable conditions in the building material market. The types of construction which may logically be expected to proceed will consist chiefly of factory construction, housing to meet industrial and community needs, construction incidental to improved land and water transportation facilities and public utility buildings and public buildings. In the larger cities some hotel and office building construction may be expected, owing to the unusual profits offered in this type of investment. Any building project which does not come under the general classifications outlined in foregoing paragraphs may wisely be postponed, at least for this year, unless unusual local conditions make the case an exception.

A definite service which architects may provide for their clients to-day consists of a businesslike

analysis of the purpose of projected structures in order to assist the owner in determining the wisdom of actually starting building at this time. If the need is of an unusually pressing nature, or if the profits to be gained by an added unit of production, or directly from rentals, are greater than the normal standard (in spite of the necessary investment at high building cost), the architect may feel justified in recommending immediate starting of the work. On the other hand, if this condition is not definite, real service will recommend delay.

The building game to-day demands play with all cards face-up on the table. The reputable contractor must bring all conditions fairly before the architect who, more than ever before, is forced to depend upon good building service and cleverness on the part of the contractor in meeting unusual conditions and in effecting every possible economy. In turn the architect must educate his client to a thorough knowledge of the difficult conditions under which both he and the contractor are forced to work. If the owner is to be disappointed, it is better that the disappointment or disillusionment comes before a large sum of money is invested. The dissatisfied client of a good architect or a good builder to-day is apt to be the client who has had to pay much more than he expected for his building and who has found this to be a fact only after the building was half completed.

The logical question then is—can any one estimate a construction job on a safe basis? The general answer is definitely proven by the unwillingness of contractors, large and small, to undertake fixed price contracts. The only safe manner for an architect to quote costs to a client is to frankly describe the conditions under which builders are working, to give careful estimates with liberal allowances for delay and changes in cost and to refuse even moral responsibility for final costs. The costs quoted must be placed on a basis of comparative logic rather than simply on definite units of labor and material costs.

Certainly this condition will prevent many projects from proceeding at this time, and to a great extent will allow only those buildings to proceed into the stage of construction, which, through one channel or another, will cause a return sufficient to offset excess cost and to protect the owner in his decision to undertake the risk of building now. As a matter of fact, few buildings other than those urgently needed for utilitarian purposes and those where cost is no object will proceed during this year.

To-day, therefore, a great business responsibility is placed upon the architect and on the builder;

together they must shoulder the burden of giving proper advice to the owner. On this basis of service many extensive organizations of the future will develop because of sound advice given at this time of unusual stress. Similarly, some of the larger building and architectural organizations of to-day are committing slow suicide through the encouragement of, or at least passive acquiescence in, the spending of unjustifiable sums of money in building construction. An ultimate realization by the client of their failure to serve will certainly exercise a detrimental influence on future business.

Having reached a definite decision to build, after careful and frank analysis of all contributory conditions, the important question is that of the relation between the building contractor, the architect and the owner. In other words, the selection of the builder, the form of contract and the method of carrying out the work.

#### Cost Plus Fixed Fee with Penalty and Bonus

Little consideration need be given at present to the straight or fixed price contract. The larger building organizations have for some time been refusing work on this basis and to-day practically no builders, even in the smaller towns, will take fixed contracts. For months the architectural and building journals have carried articles on this subject of building contracts, many by able and experienced writers. Many jobs have been let on the straight cost-plus basis; others on cost plus a fixed fee, while some contracts have carried unusual features based on conditions directly affecting the interests of the contracting parties. A careful analysis of the results of existing and recent contracts shows rather definitely that the best form of contract so far devised is what is known as the cost plus fixed fee contract with penalty and bonus clause; and it would seem that the architect can safely recommend this form of contract as best meeting to-day's conditions—a contract fair and acceptable to the contractor and affording a definite measure of protection to the owner.

The development of this type of contract may be briefly described as follows:

1. Complete plans and working drawings are prepared by the architect.
2. A careful, detailed estimate of necessary labor and amount of material is made by the contractor and submitted to the architect, together with a statement of available materials and definite sub-contract figures.
3. On a basis of the total of the above costs of labor and material the contractor estimates a lump sum as his profit, this being known as the fixed fee.

4. The contractor agrees to a penalty and bonus clause through the operation of which his fixed profit fluctuates according to the relation of the final actual cost of labor and materials as compared to the original estimate. If the final cost exceeds the estimate, the fixed fee amount is to be reduced by the percentage of excess. If the final cost is less than the estimate, the fixed fee amount is to be increased by the percentage of saving.

Thus, on a job estimated to cost \$100,000 for labor and materials, the contractor may set a fixed fee calculated at 10 per cent and amounting to \$10,000. If the job actually costs \$125,000 (an excess of 25 per cent of the estimated cost), the fixed fee is reduced 25 per cent or will amount to only \$7,500, a penalty for improper estimating. Inversely, if the finished job cost only \$90,000, the contractor's fee would be increased 10 per cent and would total \$11,000—a bonus for good work.

This form of contract offsets practically all objections to the ordinary cost-plus method of building, which has proven so objectionable in past experience; it offers greater protection to the owner than the cost plus fixed fee contract and, finally, it presents valuable checking features, which will assist the architect in his service to the owner.

From the owner's viewpoint the contractor has every incentive to economize and expedite. His interests lie with the owner's. The contractor is not called upon to assume the principal amounts of losses which are beyond his control, and the contract he signs is not a potential bankruptcy notice. The detailed information furnished in the contractor's bid makes it possible to check his buying and estimating ability and, backed by a good reputation for intelligent service, should furnish the best available insurance to the owner that his will be a service of economy and efficiency. It might be noted here that the confusing element of overhead cost should be made definite as one of the estimated costs, thus avoiding any "loading" of the job.

It is clearly evident that through the provision of a simple, understandable contract the unusual conditions of building may be met in a manner which affords merited protection to all parties involved. On this form of contract all parties may work in close co-operation to gain the best results. The contractor who has confidence in his organization and who knows his business will not be afraid to bid on this basis; and the architect who recommends the use of this form of contract and who is careful to check the progress of the work may feel that he is rendering a dependable service to his client.



# DEPARTMENT OF ENGINEERING & CONSTRUCTION

CHARLES A. WHITTEMORE, *Associate Editor*

## ✓ Some Economies in School Construction in Montreal

NOBBS & HYDE, ARCHITECTS

### PART I

#### I. Introductory

**A**T a time when much delayed building of an essential kind must be constructed in spite of what may be called artificial additions to cost due to the loss of purchasing power in the dollar, and actual additions to cost due to a short-weight hour in a shortened day, some economies in school construction may be found to be of interest.

The following notes are derived from a series of schools built for the Protestant Board of School Commissioners of Montreal between the years 1911 and 1915.

Without quoting the standing orders of the Board as to detailed requirements for the various elements of the school plan, a note on the most important element — the ordinary class room — may be of interest. The officials very rightly insist that there shall be no door in the wall behind the teacher, but a blackboard the whole width of the room. Another blackboard is placed on the inner wall (opposite the windows) between the entrance door and the cupboard, which is preferably in that wall. The back wall is provided with rails only for diagrams.

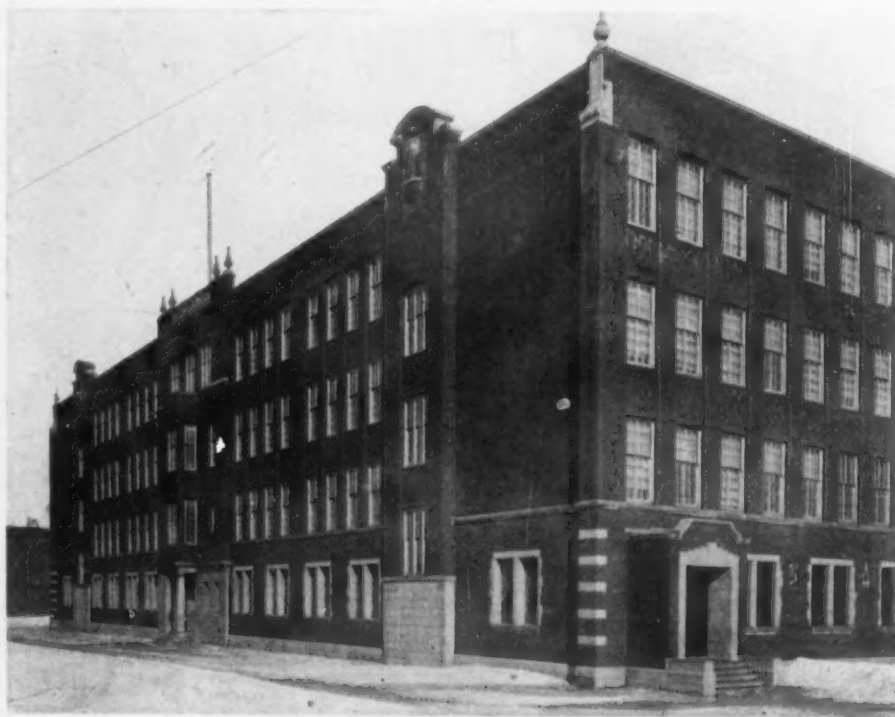
The dimensions of the class rooms are, maximum, 25 by 30 feet, to minimum, 24 by 28 feet. The usual height is 12 feet 10 inches, floor to ceiling. The window sills are 3 feet high and the glass area is one-sixth of the floor area — a rather excessive requirement.

These school buildings are thoroughly fire-proof in their construction. The fuel and heating apparatus are disconnected as far as possible from the ground floor, from which the

stairs lead up. There is no basement, the space below the ground floor being filled in, except for ventilating ducts and pipe tunnels. Where internal concrete staircases can be suitably distributed throughout the building, external fire escapes are omitted.

For some years before the war the increase in land values in districts where new school buildings were required and the increase in the cost of building have been such that rigid economy had to be exercised, both in construction and planning, to secure the necessary accommodation within estimates based on the past undertakings of the Board.

This situation has led to the omission of two elements formerly held to be essential in a well designed school — (1) large playgrounds for both boys and girls, and (2) assembly rooms. To offset this loss the indoor play rooms, essential in this part of Canada, were greatly improved, and the gymnasiums were arranged and located so as to serve on occasions as assembly rooms.



Bancroft School for Protestant Board of School Commissioners  
One of Four Such Types of Building in Montreal



## II. A Sliding Front Locker

**I**N 1913 the possession of a very restricted site at a point where a school of large capacity was required, caused the Board to adopt a plan which discarded the time-honored coat rooms, substituting therefor steel lockers placed in the corridors, which were made 2 feet wider to allow for this additional tax on their capacity.

This arrangement did not at first give complete satisfaction. The defects observed, however, were due, not to combination of locker room and corridor, but to structural errors in the locker itself. In the following year the only building erected by the Commissioners was an addition planned with lockers in corridors serving a few of the class rooms only; those, in fact, for which it was found difficult to find coat room space. While this installation was pending, the architects secured an 8-foot unit section of the lockers and placed it in their offices for the use of their draftsmen to store their hats and coats. The men were enjoined to handle the contrivance with the least possible care. Under the resulting service conditions, defects soon appeared and provision was made to remedy them and prevent their reappearance with the result that by the time the lockers were required at the school in question a very different and more durable fitting had been produced. The locker room and corridor combination, as revised, met with the

approval of the principals concerned with school management, and of the officials who had charge of the buildings and fittings.

Late in 1914, the architects were instructed to prepare plans for a new school to contain 33 class rooms, and after very careful consideration it was decided to omit all coat rooms and rely entirely upon lockers in the corridors for the storage of the pupils' clothing.

Fig. 1 illustrates the design and location of the locker unit. The body is made of 18 gauge steel, reinforced with L and T ribs or bent steel sections. Each section is 8 feet long and serves twelve pupils. The front consists of eight 12-inch sections, four of which are fixed panels and four are connected to a frame which has a lateral movement of 12 inches, facilitated by means of a ball race. On opening the fitting, the sliding and fixed panels come opposite to each other and four spaces of 12 inches each give access to the coat hooks for three pupils. A small but very important detail is that the lateral movement of the locker front is stopped 1 inch short of its full opening (or closing) by a dog, and the last inch is covered at slow speed by a controlled movement. This device serves effectively to prevent damage to the hands of children using the lockers. The locker bottom is formed in wire mesh and the fronts are perforated for ventilation. There are no partitions throughout each unit, the



Fig. 1. Corridor in the Bancroft School Showing Locker Units

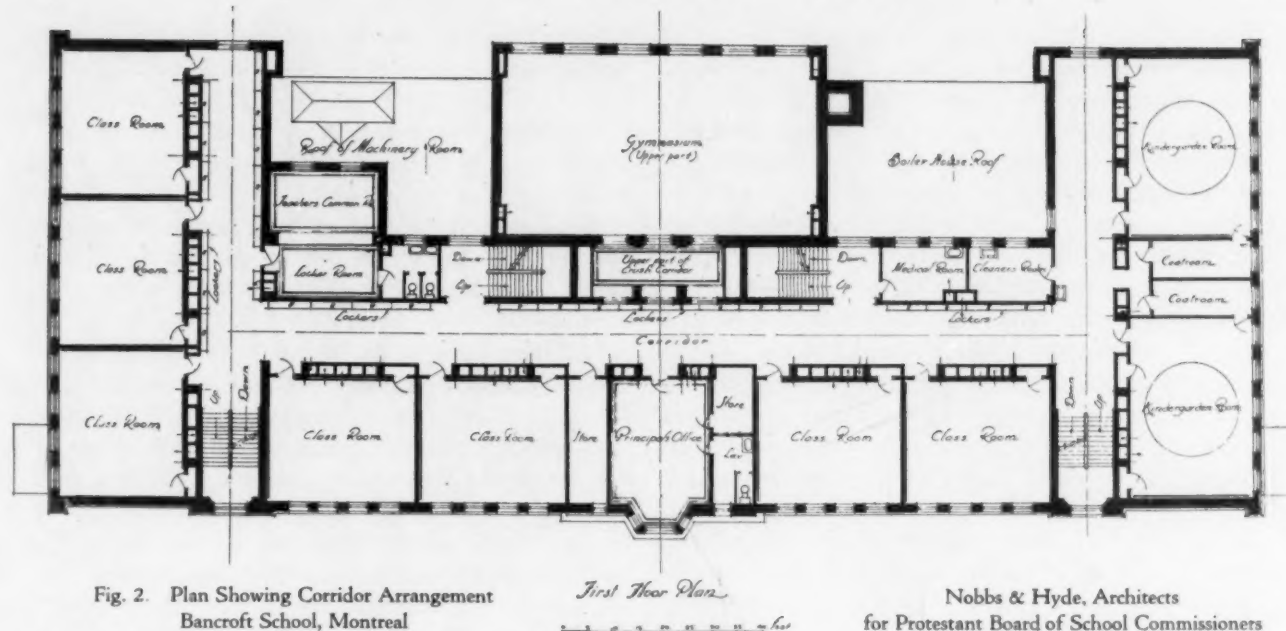


Fig. 2. Plan Showing Corridor Arrangement  
Bancroft School, Montreal

First Floor Plan

Nobbs & Hyde, Architects  
for Protestant Board of School Commissioners

wall of the building forming the locker back.

Four 8-foot units are assigned to each class room, giving capacity for the clothing of forty-eight pupils, and the teacher holds the key which opens or closes the four sections assigned to her class. It might be well to point out that the use, in Montreal, of lockers in place of coat rooms puts the most severe test possible on the system, in that the climate necessitates the storage of a maximum amount of clothing for a very large part of the school year.

The school board officials frankly admit that costs being equal they would prefer schools planned on the old coat room principle. They consider, however, that the advantages of the coat room are not so great as would at first appear. One advantage of using lockers is that the pupils gather in the wide corridors instead of in the necessarily confined coat rooms; then again, as the teacher must be present to operate the locker fronts, the pupils are necessarily under supervision.

### III. An Economic Floor Construction

IN the earlier of the series of school buildings under consideration, no attempt was made to depart from the usual types of construction in fireproof buildings. Preference, however, was given to flat ceiling systems in reinforced concrete either involving a thick, heavily reinforced slab over the 25-foot class-room span, or steel or terra cotta cores in a concrete joist construction. The flat finished ceiling was considered an essential feature, as it provided, firstly, elasticity in locating the transverse partitions, and, secondly, a plain surface offering no check to the proper diffusion of the forced ventilation. When beams are used for the 25-foot class-room span with nor-

mal slab sizes, it means either leaving the beams exposed or resorting to a furred down ceiling, with increase in cost and addition to time of construction.

It was felt by the architects that there were certain objections of one kind or another to all the systems of construction so far employed, and they decided to try an adaptation of a very old method of fireproofing in the case of some additions to an existing school. This might be termed a "steel joist" construction.

A study of the appended floor plan, Fig. 2, will show that the class rooms in all cases are bounded by an external wall on one side and stacks of ventilation ducts on the other. The width required to construct these ducts is 3 feet, but they need not occupy more than half the space available in a longitudinal direction, and the rest is occupied by piers, class-room cupboards and entrances. The 3-foot dimension of the ducts is larger than is required for a reinforced concrete or steel column, and it was found that with the use of brick, laid in cement, a pier of ample strength was economic.

Fig. 3 shows the system of construction used for several recent school buildings in Montreal. The piers are located at 15-foot centers and I beams are used as stringers, one on each side of the pier. A ½-inch steel bearing plate with bond holes extends over the whole pier area as a template for the stringer beams. The "steel joists" span the 25 feet between these stringer beams and the external walls. They are laid on the stringers and they are built into the wall. It was found that 12-inch I's at 31½ pounds spaced 3 feet 9 inches center to center would support the combined live and dead load of 125 pounds per square foot over the 25-foot span. The dimension, 3 feet

9 inches, fitted in well with the plan, as it gave two beams to each window bay and allowed the use of a self-supporting sub floor of 1 $\frac{3}{8}$ -inch spruce.

A slab of broken stone concrete, 4 inches thick, envelops the bottom flanges of the "steel joists" and is reinforced with steel rods in two directions. After the concrete slab is poured,  $\frac{7}{8}$ -inch boards are placed on edge on each side of the steel joists as centering for the fireproofing of the beams. This fireproofing in cinder concrete is carried to a level 2 inches above the top flanges of the beams. The centering is left in place to form a nailing base for the sub floors of 1 $\frac{3}{8}$ -inch stuff. Tamped cinders to a depth of 3 inches are then added on top of the concrete slab between the fireproofed joists, as deafening material. The I beams on which the steel joists rest are fireproofed with at least 2 inches of concrete. The construction throughout the corridor is a concrete slab 5 $\frac{1}{2}$  inches thick.

Important points in favor of this combination of steel and concrete may be noted:

1. All the steel employed in this system of flooring is unfabricated. It may be ordered cut to lengths direct from the mills and delivered at the site. This economic advantage is self-evident. In the case of the last school constructed, it amounted to about \$35 per ton — shipping and customs duties being serious items.

2. The steel units are comparatively light and may be erected quickly and with the minimum of

plant. The gain in time saved through the absence of fabricating operations is also important.

3. The brick piers can be built quickly (only 1,400 brick in each to a story) and when in place they serve conveniently as a basis for the form construction of the next floor.

4. The centering for the slabs is of the simplest, may be very light and can be re-used again and again. No struts are required, as the centers are wired to the steel joists.

5. There being a flat concrete ceiling throughout, no metal furring or lathing is required and the only plastering necessary is one thin finish coat. It must be confessed that the architects at first employed this single finishing coat on a concrete base with some misgiving, but having had no trouble in this connection in the case of a number of schools, they consider the method entirely sound. The greatest care, however, must be taken to have the cement surfaces absolutely free from dust or dirt of any kind and to keep them as wet as possible before the plaster is applied.

6. Economies aside, a practical advantage is to be found in the fact that the fireproof slab is placed where it can do most good enveloping the bottom flanges of the steel.

7. The heavy under floor which takes the place of the ordinary  $\frac{7}{8}$ -inch sub floor and sleepers does not increase the amount of wood employed. It also forms a really substantial base for nailing the  $\frac{7}{8}$ -inch birch finished flooring.

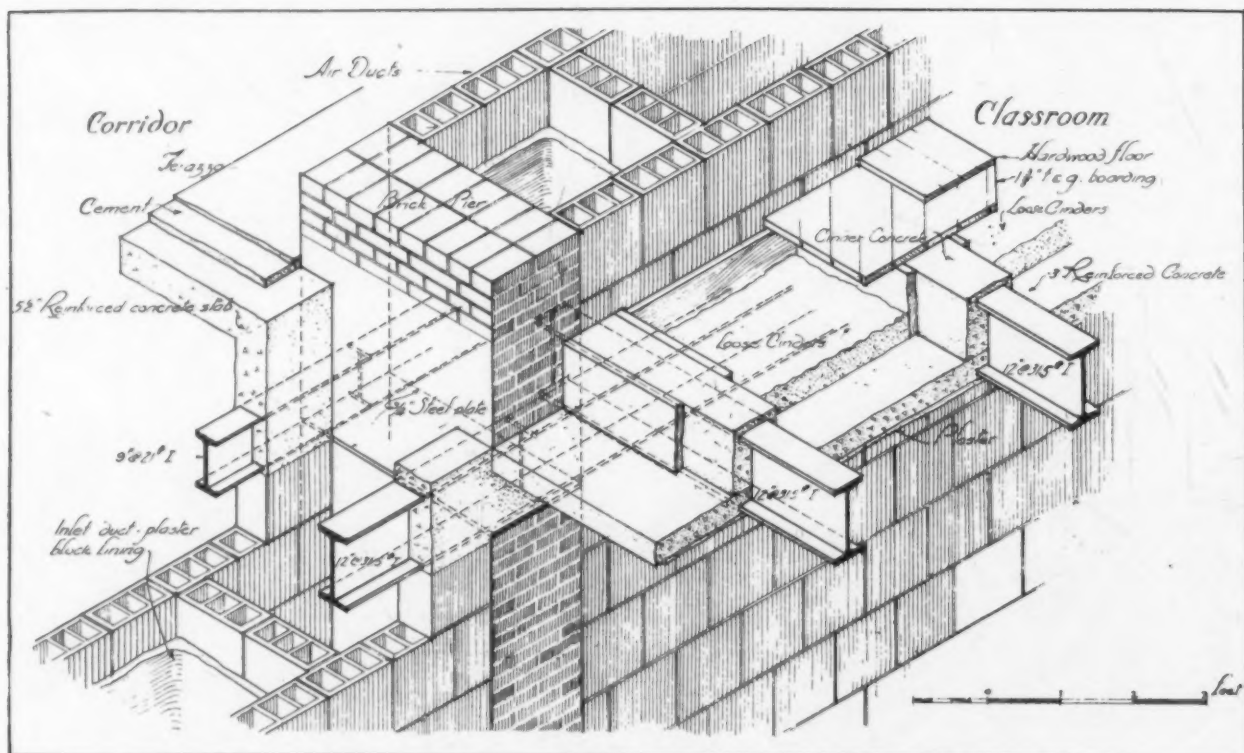


Fig. 3. Diagram of Vent Shafts, Interior Piers and Floor Construction



# Heating and Ventilating

## PART IV. (Concluding Paper)

By C. W. KIMBALL

THE knowledge of a few simple, practical rules for determining the size of the various units of a heating system is often of great value, and a number of rules worked out in practice, together with suggestions for specifications and superintendence, are given here.

### Rule for Computing Boiler Sizes

Cast iron up-draft boiler. — The size of the boiler should be at least 80 per cent greater than the actual amount of radiation in radiators and coils.

Cast iron down-draft boilers should be .....60% greater  
Steel fire box, brick set up-draft boilers  
should be .....35% „  
Steel fire box, brick set or portable, down-  
draft boilers should be .....40% „

Where coils are to be inserted in the boiler for heating water for domestic purposes, the size of the boiler should be increased, figuring each gallon of water-tank capacity as equivalent to two square feet of radiation.

### Piping System

In planning the piping system to supply the heating surfaces the mains should be as direct as possible; kept large, with the minimum number of bends; should be evenly and uniformly graded and located in the building where they will not be unsightly or undesirable.

As to the sizing of the pipes used as mains and risers there are many rules and formulæ, but the lists given below will serve as a guide. Unusual lengths and exposures will require special sizes.

HOT WATER			STEAM		
Supply and Return	Sq. Ft. Dir. Rad.	Sq. Ft. Indir. Rad.	Supply and Return	Sq. Ft. Dir. Rad.	Sq. Ft. Indir. Rad.
1" and 1"	50	30	1" and 1"	48	36
1½" „ 1½"	75	55	1½" „ 1½"	96	72
1½" „ 1½"	110	80	1½" „ 1"	200	150
2" „ 2"	200	150	2" „ 1½"	300	200
2½" „ 2½"	320	235	2½" „ 1½"	600	400
3" „ 3"	550	400	3" „ 2"	1,100	700
3½" „ 3½"	800	575	3½" „ 2"	1,700	1,200
4" „ 4"	1,100	790	4" „ 2½"	2,400	1,600
5" „ 5"	1,800	1,350	5" „ 2½"	4,100	3,000
6" „ 6"	3,000	2,000	6" „ 3"	6,700	4,500
8" „ 8"	6,000	4,200	8" „ 3"	14,000	10,000

The sizing of mains, especially of steam mains, is somewhat dependent on the height of the radiation and mains above the water line of the boiler. The higher the radiation and piping are above the water line the more radiating surface the main will feed without difficulty.

The writer's twenty years' experience in planning and supervising installations of heating sys-

tems has shown that constant watch must be kept during the planning of a system and its installation. The following are some of the points to be looked after in preparing and checking plans and specifications, and in superintendence.

### Plans

Look carefully to see if there are any rooms with bad or unusual conditions such as cold roofs over, or cold hallways under or adjacent, cold floors or ceilings or unusual exposure to winds if building sets up high. See if these are recognized in determining the capacity of the radiation.

Look over the radiator locations to see if there is sufficient space for each, and also examine the placing of risers and returns to avoid interference with constructional or decorative members.

Study the run outs from risers to radiators. Are they short or long? If they are long (over 4 feet) make them one size larger. Can they be run as shown on account of doors, timber, beams or girders, etc.?

Keep all radiators high enough above the water line of boilers, — directs 30 inches, indirects 36 inches, minimum.

Plan risers and run outs so that they will not cut through cornices or pilasters. Conceal risers where they would be objectionable if exposed.

If risers or radiators are concealed be sure the plans call for the necessary slots, if in masonry. If pipes are cut through timbers, girders, etc., see that holes are large enough to allow for pipe expansion. If pipes are to be covered see that slot or partition is sufficiently wide and deep.

Show indirect radiators large enough to scale so that sheet iron casing may be accurately estimated. See that each stack may be located properly without interference with construction.

If indirects are bunched in groups see that provision is made so that floors above will not sag under such an unusual weight.

Does any indirect stack interfere with head room or shut off light?

### Boiler Room

Are safety valves in accordance with state laws?

No boiler blow offs should be over 2½ inches and each should have B. O. cock and valve.

No safety valve should be larger than 4 inches.

Plan to get smoke pipe in place and still leave 12 inches over it, unless building is first class.

See that smoke pipe does not interfere with man-holes, nozzles or drums of boilers.

Show dampers and cleanout doors on smoke pipe, also chimney cleanout doors.

Where the large sectional boilers are used, plan to make ash pit 6 inches deeper than boiler castings.

See that feed pipes to boilers are plainly marked or specified, also blow off.

If blow off tank is required see that it is called for of proper size for the work to be done.

See that it is plain where cold water connection is to be made, also sewer or drain connections for blow off. The plumber should leave a tee in the cold water pipe near boiler. Does the plumber or heating contractor make final water connection? Make water and steam balance pipes amply large.

Drip boiler drums at each fitting to prevent any pocket and put gate and check valve on drip.

See that sewer is low enough to drain boilers and blow-off tank; if not, see that provisions are made for sump well with ejector or cellar drainer.

### Piping

Plan all the steam piping above water line of boilers at least 30 inches and preferably 36 inches.

Avoid all stairways, stair wells, windows, doors, transoms, girders, etc., in running the mains, so as to avoid pockets and extra drips or getting mains under water line of boiler.

Keep mains out of vegetable rooms and other similar rooms as much as possible to avoid overheating. If no other location is possible see that all pipe and fittings are well and properly covered.

Be sure that mains do not interfere with the swing of the doors or windows.

Look out for the expansion of the mains and run outs. Take care of this with offsets and swing joints if possible, otherwise use expansion joints.

Never use 1-inch pipe on one-pipe work for supply where steam flows one way and water of condensation must flow back against steam.

In sizing pipes see that the ends of the system are favored, as they are likely to be the least effective part of the system.

Provide for drips in the steam mains often enough to keep the mains dry and to drip all pockets.

In laying out piping, pitch mains so that the flow of steam and water is natural. Returns and hot water mains should pitch toward the boiler.

Never hang an indirect stack in toilet room or similar rooms if you can help it, on account of odors. If no other way is possible cover stacks and ducts with asbestos.

Plan accelerating coils where necessary to assist the removal of vitiated air, and on a separate system of piping.

Plan valves on each accelerating coil riser, also air valve and check on return, if gravity return

system; if vacuum system omit air valve and put vacuum valve on return.

Plan for accelerating coil near the vent opening from each room. This is preferable but not always possible. A large coil in vent head will do if space is not available for separate stacks.

Connect hot water tank to boiler piping so that the steam coil will heat the water without requiring a separate heater.

Is hot water tank provided with hand and also thermostat valves on supply, and valve and check and air valve or vacuum valve on return, also relief valve of lever type?

If there are any pipes buried under the floor, see that tile pipe and proper covering are placed around them and also see that a draw-off valve is provided to drain the pocket.

See that steam mains and returns are valved alike and for every supply valve there is a corresponding return valve and check.

See that each riser and return valve is tagged, showing what the valve controls. Every boiler room and engine room should have a diagram of the riser and return system.

### Specifications

Do heating specifications provide for cutting and patching? also pitch of pipes? (Supply, 1 inch in 10 feet. Returns, 1 inch in 8 feet.)

Specify hot water tank and large indirects to be supported from walls or pipe stands.

Specify damper regulator, stating whether for low or high pressure service.

Specify kind and location of pipe covering and bands, also painting of pipes if heating contractor is to include it.

See that air valve specifications are right. Use float air valves in all cases where water would cause trouble if it escaped from air valve unless a drip line system is called for.

Have fan foundations, heater foundations, boiler foundations, boiler settings, pump foundations and any pits been provided for in specifications? Are trenches provided where pipes are below floor?

If galvanized iron pipes or risers are to be covered, see that it is mentioned in the galvanized iron specifications; also see that the painting of sheet iron work is specified in the same place.

Call for globe valves on engine and pump drips and on supply pipes to engines, pumps. All other valves may be gate valves except on radiators where modulation, quick opening or disc valves may be provided.

See that motor wiring has been provided for.

See that the general contractor's specification calls for cutting and patching, also for water and sewer connections.

# Conflicting Paint Purposes

By GUSTAVE W. THOMPSON

THE object of this paper is to point out that the specific purposes for which paint is used are not entirely independent of the incidental purposes for which paint is used. Each purpose, whether specific or incidental, in most cases limits every other purpose, and the best that can be done is to obtain that happy medium which is dictated by good judgment.

To illustrate this point by a simple example, we will note that red lead paint, which is probably most generally accepted as the best protective paint for iron and steel, when used for railroad work, cannot be left in the red state, as railroad managers have ruled that as red is a danger signal, no red objects shall be allowed to appear along the railway route because of the possibility of giving a false signal to operating men. The result is that while railroads generally specify red lead paint for undercoating they require that it shall be covered with the dark paints that approach the black. In this example, a compromise is reached whereby the red lead paint is used for undercoats for protection, and dark colored paints used for finishing. The dark colored paints used have a purpose distinct from that of the red lead paint, and, in fact, these dark paints may have little protective value in the sense of preventing the corrosion of the iron or steel.

The purposes for which paint may be used, both specific and incidental, for exterior painting are protection, cleanliness and decoration. The purposes for which paint may be used, both specific and incidental, for interior painting are protection, cleanliness and illumination. The purpose of cleanliness includes the more definite purposes of sanitation and washability.

Let us give consideration to outside paints first and let us see how the purposes for which such paints are used more or less limit each other. By the protective value of a paint we mean its ability to preserve materials painted. This protective value is largely dependent on the durability or permanence of the paint itself. While it is desirable to select paints having great durability and consequently great continued protection, it is seldom practicable to select paints solely with this purpose in mind, for some of the most durable paints are the least decorative. For instance, black paints are generally considered as the most durable and permanent of paints. Black paints, however, have not much demand for decorative purposes. Their use on the exterior of buildings

is very limited, in fact, their use is almost entirely confined to finishing coats for iron or steel, railings, fire escapes, etc. Once in a while black paints are used for decorative purposes for line effects.

When we speak of black paints being generally considered as the most durable and permanent of paints, it must not be considered that we are advocating their use as protective coatings for iron and steel. There is one particular objection to black paints for the protection of iron and steel which militates against their more general use. This particular objection is that black paints are pretty much of the same color as iron and steel, and good continuous coats are difficult to obtain by their use.

Many strikingly red paints are also very durable. Some of these contain the oxide of iron pigments, and others are of the type of red lead paints. The use of red paints for decorative purposes is greater than black paints. Red roofs are fairly decorative and occasionally buildings are painted red. The use of red paints on the exteriors of wooden buildings can hardly be considered as common, except, of course, farm buildings; and also it has been found satisfactory to paint freight cars red, ignoring almost entirely the question of decoration.

In general, it may be stated that where highly decorative results are desired, the light tinted paints are more generally selected. These paints give reasonable durability and there is an infinite variety to select from. They vary in hue, strength and luminosity. White paints also have a great demand from the standpoint of decoration, although it is debatable whether white paints in mass are selected because of their decorative value or because of their strong appeal to the sense of cleanliness. Where they are selected, it will in many cases be found that the sense of cleanliness has been gratified to some extent—cleanliness thus becoming a decorative effect. From these considerations it is obvious that the three specific purposes for which exterior paints are used more or less control each other. Protection, cleanliness and decoration cannot be considered solely by themselves, and there must be a compromise reached where no one of these purposes is lost sight of, but each is considered and allowed to control the selection of paint with a due regard to the sense of proportion.

The durability of exterior paints is dependent



upon many factors. The decay of paint in most cases is due to the destructive action of light, moisture and the oxygen of the air upon the vehicle or binding material contained in the paint. This vehicle or binding material is usually linseed oil, which is a more or less unstable organic compound subject to oxidation and more or less subject to decomposition by moisture. It appears that light rays also have an important influence upon the oxidation of linseed oil. To secure paint durability, therefore, it is necessary to prevent as far as possible the destruction of the oil in such paints. Much study has been given to the question as to how this destruction of the oil can be prevented or rather reduced to a minimum, and many speculations have been advanced, and these speculations have been developed into fairly well defined theories.

In considering this phase of the subject, we must first emphasize that all of the matters that we are speaking of must be thought of as relative and not absolute. There is nothing absolute with reference to any of the properties of paint. There is no such thing as absolute durability, either of pigment or of vehicle. There is no such thing as absolute protection by means of paint. There is no material used for construction that is absolutely permanent. We can only speak of these things in the relative sense, as, for instance, when we say that pigments in paints are more durable than the vehicles and when we say that the destruction of paint is due to the destruction of the vehicle, we mean that the destruction of the vehicle proceeds more rapidly than the destruction of pigments, so that the life of a paint may be measured in terms of the life of the vehicle. The durability of paints is relative in the sense that we can say simply that one paint as applied is more durable than another. We can speak of the durability of structural materials in the sense that one structural material will last longer than another; thus, that painted steel will last very much longer than unpainted steel.

In securing durability of vehicle we should not seek to get anything like absolute durability. All we should seek to do is to get maximum durability. We would illustrate this point in this way. We know that linseed oil by itself does not make a good protective coating. We know that white lead as a pigment by itself and without any vehicle would not make a good protective coating. By mixing the two we get a certain amount of durability. By mixing the two in a proper proportion we get a maximum amount of durability. The proportioning of pigment to vehicle in order to get the greatest durability is an art based upon experience; in fact, experience is the only safe guide. Scien-

tific study, however, indicates that when by proportioning a paint so as to get maximum durability, this maximum durability is obtained when the decomposition of the vehicle is retarded by the protective action of the pigment. These considerations led Dr. Dudley of the Pennsylvania Railroad to go to the extreme and say that the pigment in a paint is the life of a paint. Dr. Dudley was probably a little extreme in this form of statement, but he had a clear conception of what he meant, which was that the protective action of the pigment prevented the destruction of the vehicle and thereby prolonged the life of the paint. Considering the durability only of a paint film, it is generally recognized that the greater the proportion of pigment present, as compared with the binder, up to a certain point secures maximum durability through the protective action which that pigment exercises upon the vehicle.

The protection which a pigment exercises over the vehicle in which it is suspended is due to the fact that it prevents the oxygen and moisture in the air from getting at the vehicle. It also prevents as ready access of destructive light rays. Of these three destructive influences it is probable that moisture is the most active — moisture acting to produce a chemical decomposition of the oil. The more pigment there is present in a paint, the narrower are the avenues for the entrance of moisture and the particles of the pigment are closer together. What is true in regard to the entrance of moisture is also true in regard to the entrance of oxygen in the air and of light rays. The avenues of entrance are narrower the greater the proportion of pigment present.

There is another point which must be considered here, namely, paints that contain linseed oil are liquid before application, but become substantially solid on drying. This change from the liquid to the solid state is due to the oxidation of the oil. A certain amount of oxidation, therefore, is necessary in order that a paint should perform its proper purpose. It is a common practice to think that when a paint coat is dry to the touch it is necessarily in a suitable condition to receive another coat of paint on top of it. This idea is, unfortunately, wrong. Not merely must a coat of paint on which another coat of paint is to be applied be dry to the touch before the other coat is applied, but to get good results a reasonable length of time should be given for the undercoat to develop its oxidation to a much greater extent so that by its oxidation a sufficiently hard undercoating will result to withstand the pull of subsequent coats. When paint checks, that is when there appear fine lacelike lines upon the surface of the paint, it can be generally attributed to the failure

to allow the undercoat to dry sufficiently before subsequent coats are applied. The length of time desired between coats depends upon the willingness of the owner or architect to wait for the final coat to be applied. Much more durable results would be obtained if a week were allowed between each coat of paint, but this is not often considered practicable. And here, again, there must be a compromise between the urgency of the work and the durability of the finished paint, where some sacrifice of that durability must be expected in order that the work shall be completed promptly.

Considering durability alone, therefore, we amplify our statement to the effect that maximum durability of paint is obtained by that proportioning of the oil and pigment which will give the greatest amount of protection to the oil by the pigment, and also where the maximum allowable time is granted between coats.

Considering now the question of cleanliness, white paints appear after being applied as the cleanest of paints, but white paints are the most difficult to keep looking clean, because dirt shows most conspicuously upon white paints. We have referred in considering durability to the fact that the most durable paints are those which have a high proportion of pigment. Such paints, however, will not dry with a full gloss. This has a bearing upon the question of the cleanliness of paint. Paints with a full gloss do not dry as hard and consequently do not keep as clean as paints having less gloss. You will, therefore, note that durability and cleanliness go somewhat hand in hand, and there need not be much of a compromise between durability and cleanliness in this particular. There is a popular demand for high gloss paints for exteriors. We believe that this popular demand can be met only with a sacrifice of durability and cleanliness. We are not advocating flat paints for exterior work. The paints that we are advocating are those which are midway between what might be called semi-gloss and gloss paints.

While tinted paints do not appeal to the sense of cleanliness as much as white paints do when first applied, it has generally been found that tinted paints remain cleaner longer and consequently gratify this sense of cleanliness for a longer period.

Coming now to the question of decoration, we believe that this, as a rule, is the most predominant and important purpose for which paint is used. It would be outside of the scope of this paper to discuss decorative schemes. There are so many combinations of color from which selection may be made and there are so many aspects to color problems, that this whole question is a study by itself. We will, however, say this much. Decorative effects are light effects and all single light effects

are due to the character of hue, hue strength and luminosity. Color effects cannot be considered as purely hue effects, because hues necessarily vary in strength. Furthermore, there is no hue alone that does not carry with it a certain amount of white light which acts more or less as a diluent. The effect of a single color as compared with another color upon the eye is due to difference in hue, hue strength and luminosity—luminosity representing the amount of white light which comes to the eye.

The simplest forms of color harmony are those in which the hue in two or more colors differs in strength with practically no variation in the character of the hue or its luminosity. Next in order come differences in luminosity alone, the strength and the character of the hue remaining the same. Then we may have simple color harmonies where both the strength of the hue and the luminosity vary. In simple decorative exterior painting these forms of color harmony are often used, but they are by no means the highest type of decorative effect. The highest decorative effects are obtained when there are combinations of two or more hues as separate parts of a color scheme which blend in the eye to produce the sense of harmony. We cannot proceed further with this discussion, however, as our main point will be to show that there are limitations in the decorative art due to the character of pigments which are available. There are a great many pigments to select from and yet they are limited in number when exterior painting is considered, because of their limitations as to hue, strength and luminosity and also to durability. Fortunately, however, from the standpoint of refined decorative desires, there is ample variety of pigments to select from. It is only when extreme decorative ends are sought that difficulty is experienced. There is, therefore, a real although not important limitation placed upon the use of paints for exterior decoration due to the fact that only pigments of considerable durability can be used. There are a great many pigments such as lakes and pigments made with coal tar dyes which are not sufficiently durable for use in exterior paints.

Coming now to the interior paints, protection of surfaces painted is usually a secondary object. Decoration is the main purpose. Illumination and cleanliness together with sanitation and washability each play an important part. Of course, in so far as protection implies durability in the case of interior paints, then durability is an important factor.

The durability of interior paints refers principally to mechanical injury. Interior paints do not decay as do exterior paints, probably because they



are not subjected to as severe variations in atmospheric conditions, including temperature. Interior paints, in general, are flat paints or gloss enamel paints. Except for the poorest classes of work, gloss paints, where the binder is linseed oil, are not used. This is because such paints do not harden sufficiently and become soiled very easily. Flat and enamel paints of the best modern types are neither too brittle nor too soft. They are hard enough to avoid becoming soiled easily, and also can be properly cleansed, and are soft enough to avoid scaling through mechanical injury.

Cleanliness is an important purpose in the case of interior paints. For a paint to be kept clean, it must be reasonably smooth and reasonably hard. Enamel paints are the easiest to keep clean, and if built up on proper foundation of white lead, hardly any paint gives greater satisfaction, except, as we will show, when considered from the decorative standpoint. Enamel paints are, furthermore, more washable than flat paints, although flat paints which are not too flat will wash nearly as well as enamel paints.

Sanitation, as a purpose of painting, is more important in the case of the cheaper dwelling houses, hospitals, etc. Nearly all paints are anti-septic during the period of drying, due to the decomposition and volatile products given off during the drying of the paints. Of course, if it were desirable to paint purely for sanitation, ignoring durability, decoration, etc., interior paints could be designed of very high sanitary value. Sanitation is nearly always made a consideration secondary to the other valuable purposes for which paint is used.

The illuminating value of paints for interior use is one of the most important considerations to be borne in mind. All white paints have approximately the same illuminating value. Tinted paints have less illuminating value, and the dark paints have very little illuminating value, so that if illumination alone is considered, white paints should be used. There are other important limitations, however, that must be considered. These are: in general, white paints are not as decorative as tinted paints; white paints are harder on the eyes than tinted paints. Inasmuch as the value of illumination is limited by the physiological limitations of the eye, it seems probable that white paints have not the effective illuminating value that is attributed to them. The pupil of the normal eye contracts when looking at excessively illuminated

objects and dilates when looking at poorly illuminated objects. Excessive illumination, therefore, may result in the contraction of the pupil of the eye, cutting down the amount of light that reaches the retina and really rendering the illumination less efficient. These contractions and dilations of the pupil of the eye take place between certain limits, and it seems clear that illumination in general should be such that the pupil of the eye is neither unduly contracted nor dilated. Another thing to consider is that for illuminating purposes, flat paints are better than gloss or enamel paints, for the reason that with flat paints there is a greater diffusion of the light with less contrast of light and shade, which is desirable both from the illuminating standpoint and from the decorative standpoint.

In the matter of decoration there is, of course, a much wider scope in the case of interior paints than there is with exterior paints. Many pigments can be used that are reasonably durable for interiors which would perish quickly on exteriors. Interior decoration is more complex than exterior decoration, as every room demands a more or less special treatment.

We see that there are many, as it were, conflicting interests to be considered in the selection of paints for interiors. In order to harmonize or rather compromise these various interests, we propose to lay down a few general rules with regard to interior paint. First, if high gloss paints are used they should be enamels, and except in hospitals they should be used only in those places where they do not interfere with any other purpose. Second, enamel paints should be used principally on the trim and doors and in bathrooms. Third, enamel paints or near enamel paints should be used in hospitals except in those places where eye strain might result. Fourth, all large surfaces should be painted with an eggshell gloss so as to get the proper diffusion of light. Fifth, pure white paints should never be used, but should be tinted slightly to harmonize with the general tone of the room. This applies to ceilings even when calcimined.

It will be seen from this paper that we do not believe there is any one purpose for which paint is used that can be considered a dominating purpose. All other purposes for which paint is used have a value to be determined by the peculiar demands of the case. In selecting paints, therefore, extremes must be avoided and a sense of proportion always in control.